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POINTS FOR PRODUCERS.

The Fruiting of Trees in Consecutive Seasons.

The view that fruit trees tend to bear heavily and lightly in alternate seasons is often made the basis of a recommendation to thin a heavy crop borne one year in order to obtain a better crop the succeeding year, says the Bulletin of Agricultural Intelligence and Plant Diseases of the International Institute of Agriculture in reviewing the fifteenth report of the Woburn Experimental Fruit Farm. It appears, however, that the tendency towards alternate cropping, as it may be called, is very feeble, and that there is at the same time an equally potent tendency towards consecutive cropping; that is, that a tree bearing particularly well or badly one season, will probably do the same in the succeeding season, whilst the chief factor in determining good or poor bearing is undoubtedly the atmospheric conditions, and not any innate tendency of the individual tree to either alternate or consecutive fruiting. The existence of a tendency towards alternate bearing is indicated by the fact that young trees, if prevented for four years from bearing after they have come to the age for so doing, will bear exceptionally heavy crops as soon as they are allowed to bear. But it was only in one series of experiments on some 300 young apple and pear trees during the seasons 1899 to 1903 that such a tendency was actually recognised. Observations on the same trees made when they were younger, during 1894 to 1897, showed that their tendency then was towards consecutive bearing, and in another case of apple trees where the observations apply to over 5,700 instances, extending from 1904 to 1915, the tendency has been, with only one slight exception, towards consecutive bearing. But this tendency affects the results to only a slight extent, about 12 per cent., the remaining 88 per cent. being attributable to peculiarities of the season, and not to the individual behaviour of the trees. It is noticeable that the preponderating influence of external conditions become more marked as the tree is left more to its natural habits, *i.e.*, as it is less pruned, and also as the age of the tree increases; and it is more marked in the case of trees on the paradise stock than in those on crab stock, this being doubtless a consequence of the latter coming less rapidly to full maturity than the former.

If in a plantation consisting of a large number of individual trees, whether of the same or of different varieties, it is found that good and bad fruiting seasons alternate with each other, it is evident that such alternation must be caused by some conditions affecting all the trees alike, and not to any tendency to alternate bearing exhibited by the individual trees; for such a tendency, if it existed, would be exhibited by different trees in different seasons, and the effect of it would be to bring about uniform production in the plantation as a whole. The alternation of good and bad years has been uniformly exhibited to a most marked extent in some plantations available for observation over a period of 20 years. As the injury to these crops

has nearly always been due to spring frosts, it is evident that the alternation of good and bad years is due to the tendency of such frosts to occur alternately in consecutive seasons.

Where do Bloodworms Come From?

One of the perennial inquiries of correspondents is for information as to the origin and treatment for bloodworms. Ignoring the query "which came first, the egg or the worm?" the Veterinary Lecturer (Mr. F. E. Place, B.V.Sc., M.R.C.V.S.) says that to-day, the bloodworms develop from eggs laid in the horse—a single bloodworm is capable of depositing anything up to 30,000 eggs. These pass out in the dung, and develop in moist spots. The newly-hatched worms are taken up in the food or water by other horses, with the result that infection rapidly spreads. Preventive measures are simple and effective—they consist in fencing the dam, liming the worm-infested pasture, and cleaning the water trough.

Sulphur in Haystacks to Prevent Damage by Mice.

Among the various expedients suggested as means of preventing the damage of haystacks by mice, that of spreading sulphur through the hay has received a good deal of attention. With a view to ascertaining the wisdom of adopting this practice the Director of the Department of Chemistry (Mr. W. A. Hargreaves, M.A., D.Sc.) was communicated with. In replying Mr. Hargreaves said, "I would not recommend the use of sulphur for preventing mice in haystacks. If the sulphur is efficient it is probably due to its oxidation to sulphur dioxide, and if the oxidation is rapid there will be a strong risk of spontaneous ignition of the sulphur and the carbonaceous matter."

Five Millions a Year.

In 1915, according to a memorandum on the organisation of Scientific Research Institutions in the United States of America, the expenditure of the Department of Agriculture in that country for the year 1915 was £5,330,000. There are about 15,000 employees in the Department. Nearly 2,000 persons are engaged in scientific investigation and research, 1,400 in demonstration and extension work, and 700 in administration and supervising work.

Recent Development of German Agriculture.

A prefatory note by the Right Hon. the Earl of Selborne, K.G., G.C.M.G. (President of the Board of Agriculture and Fisheries, London) to a memorandum dealing with the development of German agriculture in the last 30 to 40 years, and prepared by Mr. T. H. Middleton, C.B., reads—"It has been part of my duty at the Board of Agriculture and Fisheries to make a study of the agriculture of Germany, and in the course of my work it became apparent to me

that if agriculture had made no more progress in Germany than it has in the United Kingdom during the period 1895 to 1915, the German Empire would have been at the end of its food resources long before the end of the second year of the war, and that, as a matter of fact, the war was being fought by it just as much on an agricultural as on a military organisation of the nation."

In summarising the results of his investigations Mr. Middleton, under the pertinent title of "Some Lessons," mentions that much attention has been given to organising production from German soil. The credit system is well adapted to promote good farming; co-operation is largely resorted to. Education has been well developed; societies have been created to provide leadership.

Germany, and especially Prussia, has developed a most efficient system of agricultural education. The policy aimed at was in the first place to secure facilities for the study of agriculture in institutions of university rank. It was recognised that before suitable instruction could be provided for small farmers there must first of all be careful study of methods and principles, such as is only possible in institutions possessing a large and well trained staff. Up to 1910 some 65,000 agriculturists had been trained at Prussian universities or colleges. The influence of the farming of these men on the cultivation of German soil cannot be proved by figures, Mr. Middleton concludes, but there can be no doubt that the readiness which German farmers have shown to adopt the aids to production which the twentieth century has placed within their reach is due to the leavening of the mass by educated agriculturists.

Government Butter and Bacon Factory.

With the object of encouraging the development of the dairying industry the Government has intimated its intention of establishing a butter and bacon factory at Port Lincoln. In announcing the Government's determination the Minister of Industry (Hon. R. P. Blundell, M.P.) stated that they could not look for any profit from the Port Lincoln factory for at least 12 months. The expenditure would be incurred by the Government to ensure that the settlers should have an opportunity to dispose of their products. It was anticipated that a large number of people in the vicinity of Port Lincoln would in future go in for dairying and pig raising, as the land was very suitable for the purpose.

Strangles.

Strangles, being due to a germ, is easily communicated from one horse to another. By far the commonest way of contamination is through horses drinking at common water troughs, or being stabled together in stables in which affected horses have been. Therefore it is advisable, says the Government Veterinary Lecturer (Mr. F. E. Place, B.V.Sc., M.R.C.V.S.) in the case of teams carting wheat, and so forth, for the teamster to carry a bucket, and obtain water from a pure source. In addition, it is wise to put the horses in an open yard rather than in a close, ill-ventilated stable when away from home.

Buying a Bull.

"What are the principal features to be considered in choosing a Shorthorn bull of milking strain?" This question was referred to the Veterinary Lecturer, who says:—"First and foremost a good milking record on both sides—bulls that have got milkers, milkers that have bred bulls. The young bull should have all the masculine points capable of development, and be massive and short-legged for his age; forehand, loins and quarters should be well developed. Teats on scrotum are often found in good milking strains. The muzzle should be flesh-colored, not black. Color yellowish red, with or without white; and if roan, yellowish, especially inside ears and on cod. White is to be avoided in South Australia, as the color is attractive to insect pests; and white beasts, as a rule, are not so sturdy as colored. The yellow or orange is necessary for a good butter-fat return. In England there is a return to the 800gall. cow, well fleshed, and of real Shorthorn character.

Imports and Exports of Fruits, Plants, Etc.

During the month of March, 1917, 9,405bush. of fresh fruits, 10,638bush. of bananas, 1,046pkgs. of potatoes, 39pkgs of plants, seeds, and bulbs, and 1,880 empty wine casks were examined and admitted at Adelaide and Port Adelaide under the Vine, Fruit, and Vegetable Protection Acts of 1885 and 1910; 286bush. of bananas (over ripe) were destroyed, 113 empty wine casks were fumigated, and 297bush. of apples were returned on account of codlin moth, &c. Under the Federal Commerce Act 12pkgs. of fresh fruits, 13,042pkgs. of dried fruits, 453pkgs. of honey, and 2pkgs. of seeds were exported to oversea markets. These were consigned as follows:—For London, 12bush. of apples, 12,942pkgs. of dried fruit, and 453pkgs. of honey; for New Zealand, 100pkgs. of dried fruit and 1pkg. of seeds; for Batavia, 1pkg. of seeds. Three lots of seeds were rejected on account of very low germination. Under the Federal Quarantine Act 592pkgs. of plants, seeds, and bulbs were examined and admitted from oversea sources. Three consignments of seed were cleaned by grader on account of the presence of weed seeds.

During the month of April, 1917, 8,464bush. of fresh fruits, 8,320bush. of bananas, 2,239pkgs. of potatoes, 4pkgs. of onions, 456 empty wine casks, 48 empty cases, and 56pkgs. of empty bags were examined and admitted at Adelaide and Port Adelaide under the Vine, Fruit, and Vegetable Protection Acts of 1885 and 1910; 16bush. of bananas (over ripe) were destroyed, 34 wine casks and 56pkgs. of empty bags were fumigated. In addition 260 empty cases were returned to New South Wales. Under the Federal Commerce Act 17,793pkgs. of dried fruit, 85pkgs. of preserved fruit, and 735pkgs. of honey were exported to oversea sources. These were consigned as follows:—For Liverpool, 17,596pkgs. of dried fruit, 10pkgs. of preserved fruit, and 735pkgs. of honey; for New Zealand, 197pkgs. of fine Act 881pkgs. of plants, trees, and bulbs were examined and admitted from oversea sources.

INQUIRY DEPARTMENT.

Any questions relating to methods of agriculture, horticulture, viticulture, dairying, &c., diseases of stock and poultry, insect and fungoid pests, the export of produce, and similar subjects, will be referred to the Government experts, and replies will be published in these pages for the benefit of producers generally. The name and address of the inquirer must accompany each question. Inquiries received from the question-boxes established by Branches of the Agricultural Bureau will be similarly dealt with. All correspondence should be addressed to "The Editor, *The Journal of Agriculture*, Adelaide."

VETERINARY INQUIRIES.

[Replies supplied by Mr. F. E. PLACE, B.V.Sc., M.R.C.V.S., Veterinary Lecturer.]

[Extraordinary pressure on space has rendered it necessary to very considerably curtail the inquiry department. Replies to those questions of more general interest only have been published; however, every query received has been replied to through the post.—ED.]

"E. W. P.," Koppio, reports the death of lambs, and asks whether stinkwort is responsible.

Reply—Stinkwort can hardly be classed as a poisonous plant, but it is a highly indigestible one, as the portion sent shows; but if sheep have other food inside them when they go on to it, and wet is avoided, they do not come to much harm. Parasites such as stomach worms, cause anaemia, and they cannot then digest what otherwise they would. When lambs seem unwell, they will benefit by a few days course of Cooper's worm tablets.

"A. H. N.," Quorn, has a foal, three months, which is getting crooked in front legs.

Reply—The symptoms point to rickets, due possibly to constitutional weakness. Do not do anything to the legs beyond rubbing them daily with a mild embrocation such as can be procured at any store, diluted to half its strength with olive oil. Give a tablespoon of compound syrup of phosphate of iron in a little milk twice a day.

"E. J. M.," Mount Wedge, has a chestnut gelding, subject to attacks of colic.

Reply—This is often the case with chestnuts. Give 10 drops tincture nux vomica on tongue morning and evening for three weeks, and the attacks will diminish in severity. If severe, give a teacupful of spirit, preferably gin, half a teaspoon of essence peppermint, and ½ pint warm water.

"J. F. D.," Burnside, Strathalbyn, has sheep losing condition. .

Reply—The reason sheep do badly in the Meningie scrub in winter is that they suffer from large parasites such as worms and flukes and microscopic ones, such as sarcosporidia, and the best way of treating them is to send them right away for a change of pasture for some months. A lick that may do some good would be salt 3lbs., sulphur 1lb., sulphate of iron 1lb., slaked lime 1lb., bonemeal 1lb., and molasses meal 4lbs. per 100 sheep. When sheep are noticed to be bad dose them for a few days with Cooper's tablets.

"R. W. R.," Rockleigh, desires information in relation to rye as feed for horses.

Reply—In some parts of the world, Russia for instance, rye is fed to horses as grain, but it is not to be recommended, because of its difficult digestion. Still, if it is a case of necessity it can form a third of the grain ration crushed, but it should be given in very small quantities to begin with; at least a fortnight should elapse before it is given in quantity.

"R. H.," Monarto, has a bull with lump inside right hind leg below knee (? hock) as big as a man's fist; seems to contain proud flesh.

Reply—Apparently a fibrous tumor, resulting from an injury. If it is possible to tie a piece of whipcord tightly round the root of it, do so, and let the growth

slough off. If this cannot be done throw the bull and scar it off with a hot iron. A shovel makes a good implement for the purpose, but as it holds a big surface of heat, hold a cold shovel between it and the leg to prevent charring sound flesh. Put equal parts of bluestone and alum in a tin in the oven for an hour or two till burnt to a fine powder and dress daily with this till healed. If the powder falls off dress lightly with tar before applying.

"M. E. W.," Mount Wedge, has a mare which went very lame off front leg, suddenly while wheat carting; swelling between knee and shoulder; now on knee.

Reply—Failing any injury to the foot, such as a nail picked up and buried in the foot, which should be carefully searched, the symptoms seem to point to acute synovitis, and the following treatment may be tried:—Give 10 drops tincture rhus tox. morning and evenings in a little honey smeared on the mouth. Bathe the swellings well with hot water, and then rub in a little of tincture rhus tox. 1oz. to methylated spirit 1 pint.

"W. H. D.," Tintinara, has a foal, four months, which is losing condition, and has slime hanging from mouth; does not care to suck.

Reply—Examine mouth well for grass seeds causing swelling of gums and throat; if these are not present the symptoms will probably be due to internal abscesses, in which case get some acetozone and dissolve as much as will lie on a shilling in a teacup of water and give a tablespoon to the foal three times a day till recovery sets in, then twice a day for a week longer. Acetozone is, like many other drugs, very expensive now; it is put up in small bottles, and obtainable from chemists.

"A. G. T.," Warcowie, has mare which was staked in hind foot middle January; stake pulled out two days after, free discharge, bathing, poulticing, embrocation; leg much swollen, painful, and discharging at hoof head.

Reply—The neighbor's advice to throw and open up the wound is very sound, and should have been carried out three months ago. As the mare is in foal an accident in that direction must be expected. The treatment in the main has been correct, but the applications of liniment were not advisable while the inflammatory condition was active. Having opened out the wound, and made sure there is nothing else to come away, take every precaution to avoid the navicular joint when doing so. Apply spirit of iodine twice a day for a week, poulticing with hot bran as well, then the spirit once a day till well, which latter condition is not likely to come about unless the operation can be performed by a qualified veterinary surgeon, as there are so many tissues that may be damaged by one who does not know the anatomy of the part thoroughly.

"A. C. B.," Bute, has mare which appeared to be in foal in last July, but did not deliver. The milk dried away, was served again last October, and now is passing stinking matter; has been doing so for three months, and has fallen away to nothing.

Reply—The foal was not passed in the first case and became mummyfied. Apparently a later conception took place, but this foal died and did not mummyfy, hence the discharge. You are quite right in supposing the mischief is in the breeding bag, but why did you not ask for advice earlier? I very much fear things have gone too far now for advice to be of much good. Surgical removal of the remains is necessary. After removal the womb will have to be syringed out with a warm solution of Condy, as much as will lie on a shilling to 2gallis. of water, twice daily. Ten drops of tincture pulsatilla each evening, and a similar dose of tincture arsenicum each morning may do something to help.

"E. F. D.," Lameroo, had a cow affected with red water after calving.

Reply—Satisfactory treatment for red water is 1lb. Epsom salts, 1oz. liquor ferri perchlor., 1oz. ginger in a quart of warm red wine. Prevention may be carried out by giving the cow morning and evening for a fortnight before calving, 10 drops of tincture arsenicum. This may be mixed with a spoonful of honey, and smeared on the nose or tongue.

"G. W.," Sandalwood, has a stallion, aged, which ran in paddock with mares for two months, when worked fell away, and is very sluggish. Fed on half hay chaff, half cocky chaff, 3lbs. oats, and 2lbs. molasses.

Reply—An aged stallion would very likely overdo himself with young mares, but his present feed is very unsuitable. Two pounds molasses is far too much for a horse, and will induce chronic indigestion. No weight of chaff and cocky chaff

is quoted, and the ration may be too much or too little, in either case indigestion would result. Cocky chaff is very unsuitable for a stallion. The oats might be raised to 9lbs. with advantage. It does not appear to be a case for drugs so much as diet. But if he does not improve in a month let me know.

"H. C. P.," Honiton, Y.P., has a cow which chews bones but will not eat bone-meal, fell off after calving, and in spite of routine treatment seems at a standstill.

Reply—She is evidently suffering from lack of vitamines, which can best be supplied by lucerne or similar green fodder. Failing this, let her have twice daily half a teacup of ship's limejuice diluted with a little water, also once a day a tablespoon of dried yeast in a pint of new milk warm. If after a week of this she picks up at all, give in addition to the milk and yeast a teaspoonful of tincture nux vomica.

"W. H. A.," Saddleworth, has new-born pigs, which shake and twitch: can hardly put hind legs to ground. Sow good and quiet; always fat and well; very cold day when born.

Reply—The trouble is chorea, or St. Vitus dance, and probably the piglets have anticipated treatment by dying, but if not three drops tincture nux vomica three times a day might help them. The disease is nervous, and when a sow is too fat the pigs suffer in development; the cold day was also partly responsible. If they survive they will be more profitable as roast sucking pig than kept to grow into pork, as they will always shake and twitch. The sow is not necessarily to blame, but if her next litter should be like these then her duty in life will be to die.

HORTICULTURAL INQUIRIES.

[Reply supplied by the Horticultural Instructor, Mr. GEO. QUINN.]

"A. J. G.," Lyrup—(1) The residue from the acetylene generator consists principally of water-slaked lime. It should not be dug in fresh around the roots of trees or vines, but spread to dry into powder, when it may be scattered thinly over the surface of the soil, and harrowed or weathered into the soil by the action of rain. (2) Lime sulphur spray should prove useful in checking oidium mildew on grape vines, even if applied as late as the present, as it should destroy many spores. (3) The sulphate of iron and sulphuric acid wash is used upon grape vines in winter to destroy the resting forms of the anthracnose or black spot of the vine. It is swabbed on to the spurs and rods with a mop, and should not be allowed to freely touch the flesh or clothing of the operator, as its action is very caustic. The quantities used for a small area are approximately 28lbs. of iron sulphate, 1lb. sulphuric acid, and 5½galls. of hot water. The crystals of iron are put in a wooden or earthenware vessel, and the acid poured over them. Then the hot water is added whilst the mass is stirred with a wooden paddle. It is well not to make any more than will be used in a day's work.

POISONING BIRDS AND MICE.

The following particulars relative to the use of strychnine for poisoning birds and mice have been supplied by the Director of Chemistry (Mr. W. A. Hargreaves, M.A.):—"The proper proportions to use for poisoning mice are 1bush. of wheat to 1oz. bottle of strychnine. If ordinary strychnine is used it will require to be dissolved in acetic acid and water in the following proportions:—12 fluid ozs. of strong acetic acid (not glacial) and 24 fluid ozs. of water. Soluble strychnine can be dissolved in water alone. The solution is poured on the wheat in an earthenware vessel and stirred well until the wheat has soaked it up. The wheat is then spread out to dry. Kerosine tins would do for the mixing if smaller quantities were used."

BARRENNESS IN LIVESTOCK.

The Principal of the Roseworthy Agricultural College, Mr. W. J. Colebatch, B.Sc. (Agric.), M.R.C.V.S., delivered the following address at the Conference of South-Eastern Branches of the Agricultural Bureau:—

Of all the misfortunes that dog the footsteps of the stockmaster the loss of increase is by far the most serious. Apart from the heavy monetary losses that may be occasioned thereby, when the disaster affects large numbers, or when stud animals are concerned, there is the deep disappointment of the breeder who is earnestly endeavoring to improve his stock. In effect, he is deprived of the opportunity of exercising his skill as a breeder, and since, with the exception of pigs, farm stock reproduce but once in each year, the loss of time is a matter for grave concern.

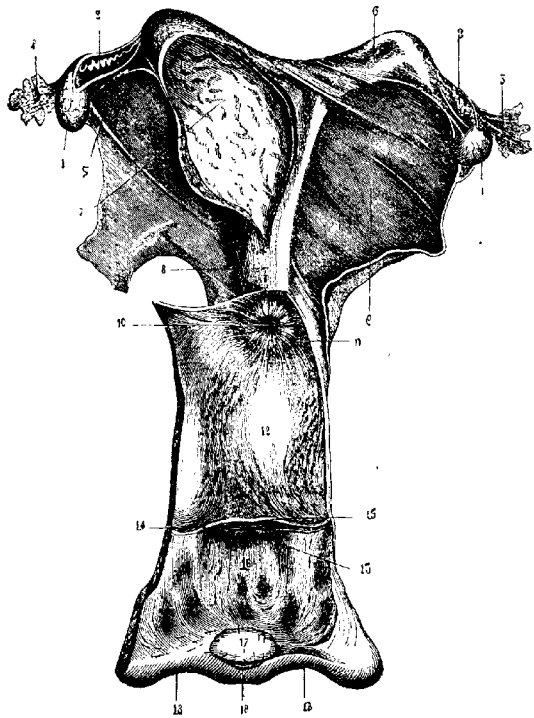
The extent to which infecundity exists amongst our flocks and herds is greater than is generally believed. In the "Thoroughbred Stud Book" it is shown that 26.64 per cent. of the mares are infertile or slink their foals. The Royal Commission on Horse Breeding concluded that 40 per cent. of the mares chosen for breeding fail to produce foals, whilst in the French studs 40.43 per cent. proved barren. With small stock, infertility is less frequently observed, but the average loss with cattle amounts to about 20 per cent. The above figures have reference to what may be regarded as normal conditions, and when circumstances are more than usually unfavorable the waste is very much greater. It behoves us, therefore, to examine closely the exciting and contributory causes, in order that we may protect ourselves as far as possible from undue losses and vexatious failures.

In the first place I would draw clear distinction between the unfruitfulness resulting from inability to procreate, and that due to incapacity to deliver and rear healthy offspring. Both conditions are equally disastrous to the breeder, but the latter is under his control to a greater extent than the former.

Inability to Procreate.

Inability to procreate may be due to a sterile condition of either sex, but generally speaking the fault lies with the female. It is sufficiently obvious that permanent infertility in the male would be quickly detected, and it is only in the case of temporary loss of power to propagate that doubts could arise. It is true that male animals, through long-continued sexual restraint, excessive stud work, plethora, debility, injury, or disease may be rendered uncertain sires, and where there are grounds for suspicion, the facts should be closely inquired into. As a rule, however, the male animal is cleared of responsibility by reference to the results of his mating with other females, and it then remains to discover whether the failure to conceive indicates a condition of sterility in the female, or merely physiological incompatability.

This can be only determined positively by successive matings with one or two other males, although it is well to have the generative tract examined beforehand, in order to avoid useless effort.



GENERATIVE ORGANS OF THE MARE; ISOLATED AND PARTLY OPENED.—(*Fleming*).

1, 1. Ovaries; 2, 2. Fallopian Tubes; 3. Pavilion of the Tube, External Face; 4. Ibid., Inner Face, Showing the Opening in the Middle; 5. Ligament of the Ovary; 6. Intact Horn of the Uterus; 7. A Horn Opened; 8. Body of the Uterus, Upper Face; 9. Broad Ligament; 10. Cervix, with its numerous folds; 11. Cul-de-sac of the Vagina; 12. Interior of the Vagina, with its Folds of Mucous Membrane; 13. Urinary Meatus and its Valve; 17. Clitoris; 18, 18. Labia of the Vulva; 19. Inferior Commissure of the Vulva.

Assuming that the reproductive organs are apparently normal, and that pairing with different mates has proved ineffective, it is a logical deduction that we have to deal with an animal incapable of breeding

under existing conditions, and the only feasible plan is to modify these circumstances. The refractory animal should either be moved to another district, with dissimilar climatic and field conditions, or else the diet should be varied so as to add tone to her system and stimulate the sexual powers. These changes, however, may also yield negative results, and there is then strong presumptive evidence that we are confronted with a case of incurable sterility. This may be due to inability to produce living egg cells, a condition often associated with a weakened constitution, resulting from inbreeding, a blocking of the female tube that conducts the eggs from the ovary to the womb, or simply to an indisposition to breed. Animals that are bred for the first time after many years of their breeding period have elapsed are apt to lose the sexual instinct and procreative faculty, and we have other instances of permanent sterility in hermaphrodites, freemartins, and many hybrids.

With regard to mares, it may be remarked that some can only be depended upon to breed every other year, the intervening season being given up entirely to the care of the foal. We have also to recognise that some animals, although by no means infertile, are habitually "shy" breeders, and therefore frequently unprofitable.

Next let us consider the case of those females that have been found defective upon examination. There are a number of possible causes of barrenness that are discoverable by exploration. For example, the essential organs—ovaries—may be cystic or affected by tuberculosis, the generative system may be the seat of inflammatory processes, tumors, abscesses, or cysts; it may be obstructed by strictures, displacements, adhesions, a tough persistent hymen, or the accumulation of fat in the finer tubes. Further, the entrance of the womb, which as a rule is a tube of small calibre with very thick muscular walls, may be temporarily occluded by reason of nervous spasm, or permanently so through induration supervening on severe inflammatory conditions. Again, it may happen that the afterbirth, a mole, or even a foetus, has been retained within the womb, or that the surface of the genital passages is coated with a mucoid or muco-purulent secretion, which destroys the vitality of the "seed."

Many of these conditions may be detected without trouble, and in not a few of them slight surgical interference will furnish a complete remedy. There are others, however, such as tuberculosis of the ovaries, malignant growths, atrophy, or fatty degeneration of the ovaries or finer channels, and super-sensitiveness of the tract, due to brain or spinal cord disease, that defy all known methods of treatment.

Probably the commonest troubles that call for attention on the part of the stockbreeder are:—

1. Nervous irritability, leading to excessive secretion of mucus and ejection of the seminal fluid. To overcome this some rely upon a second service, following closely upon the first; others dash cold water over the animal immediately after mating, and force the animal to take exercise. In some cases good results have been obtained by mating

the animal when she is physically exhausted. It may happen, however, that the hyper-sensitive nervous system refuses to be quietened, and barrenness results from failure to hold the fertilising elements. The only satisfactory way of bringing such females into "use" is to resort to artificial means of effecting impregnation.

2. Acid mucus in vagina and womb. The reaction of this secretion may be tested with litmus paper, and if acid it may be corrected by injections of an alkaline solution prior to service.

3. Closure of entrance to womb. This condition is frequently met with in mares and cows, and when present it renders conception an utter impossibility. By manual dilatation just prior to mating an open passage can usually be obtained; but if not, resort must be had to the use of relaxing dressings, such as belladonna ointment.

4. Relaxation of the mouth of the womb. The womb in these cases is generally ballooned, and its mouth is widely expanded. Whilst this permits of the free entry of semen, it also allows it to escape, and barrenness not infrequently results. Cold astringent lotions should be syringed in before service, and, if necessary, the artificial system should also be adopted.

5. Condition and diet. Animals required as breeders should never be allowed to lay on fat to excess. The diet should not be lacking in flesh-forming elements, nor should it contain too large a proportion of fats, sugars, and starches. A plethoric condition is probably more inimical to breeders' interests than the opposite extreme, but both should be avoided as far as possible. An underfed, over-worked animal often produces imperfectly ripened eggs, and in any event she is quite unfitted to the task of developing and sustaining a foetus in addition to herself.

Inability to Produce Viable Offspring.

In stock work we frequently come across instances in which female animals, although quick to conceive, lack the power to carry their young for a full term, or to so nourish them during gestation that when born they are capable of entering upon a separate existence. When pregnancy is interrupted in this way, the effect upon the mother will be more or less serious, according to the stage at which the mishap occurs. If it takes place within a few weeks of conception, the accident may not even be noticed, and the first evidence that abortion has occurred will be the return of oestrum or heat. If, on the other hand, delivery should take place about mid-term, or at any subsequent time up to the 300th day for mares, 200th for cows, 140th for ewes, and 100th for sows, the consequences may be serious, especially if the young has been dead some time prior to birth. When delivery takes place shortly before the expiry of the normal period, and the foetus is sufficiently developed to maintain an independent existence, even for a brief period, we have what is termed premature birth. Amongst farm stock cows are most subject to slip their young before time, but the misfortune is by no means rare with mares and ewes. Sows, however, expel their young at the proper time almost without exception. In the non-contagious form of abortion, the young are generally cast

in the early part of pregnancy; but when an outbreak of the contagious disease occurs, the expulsion of the foetus is more frequent in the later stages. On the farm it is usually the non-contagious type that is encountered, and with a view to understanding the best means of combating it we will first inquire into the nature of the complaint.

It is generally conceded that some animals are naturally predisposed towards abortion, and can only with difficulty be brought through to full term. If properly managed during the earlier pregnancy, this weakness will tend to disappear with age. Other generally accepted causes are:—

1. Rough, stormy weather or sudden and extreme changes in climate. The natural conditions under which most farm stock are kept in Australia inures them to inequalities of this character. It must be admitted, nevertheless, that inclement weather will often hasten the actual hour of birth amongst animals due to produce young. However, except in an occasional instance, when an animal prone to abort is affected, I doubt if it influences appreciably the number of abortions amongst farm animals. Still, for the sake of both mother and offspring, it is wise to allot fields that afford good shelter to stock heavy in young.

2. Faulty feeds and feeding. Bulky, innutritious fodders, by loading up the alimentary canal, cause indigestion, impaction, and timpany, and thus bring undue pressure to bear upon the gravid uterus or womb. This condition is fraught with great danger to both the mother and its offspring. The appearance of colicy pains leads to violent struggling, straining, and frequently heavy falls. In such circumstances there is always imminent danger of abortion.

Again, food of poor quality, such as musty chaff or grain, rusty or smut-infested hay, or mouldy silage are very liable to set up digestive disorders, which may react prejudicially on the womb and its contents. Ergot on rye or pasture grasses, which is credited with ecbolic action, is rarely met with in Australia.

3. Large drinks of cold water, particularly when the food canal is almost empty, as after a long journey, are a source of danger, and dirty foetid water or frosted herbage cannot be consumed without risk.

4. Violent and sudden exercise, heavy fatiguing work, especially if given intermittently, working between narrow shafts, backing heavy loads, and over-riding and over-driving, are all to be avoided with pregnant animals.

5. Severe frights, excitement, and fear are liable at any time to bring about a miscarriage, hence it is well to recognise that rough handling, cruelty, the use of a spur, and the reprehensible practice of dogging pregnant stock, may have serious consequences.

6. Diseases of a serious character, whether the womb and its contents be involved or not, are a potent cause of abortion, and it is often impossible to carry out proper treatment without increasing the risk already occasioned by the severity of the symptoms. Drastic purgatives, for instance, tend to stimulate the muscles of the womb, yet in certain ailments they cannot possibly be dispensed with.

7. In addition to the foregoing, there may be mentioned several other causes of minor importanee, namely, railway travelling, sloping floors, slips and falls, insanitary surroundings, enemata, and manual examination of the rectum or generative passages.

Prevention of Abortion.

We are now in a position to consider what steps should be taken to shield breeding stock from abortion and its results. Obviously the dangers already referred to must be avoided altogether or reduced to a minimum. Where a natural predisposition to abort is known to exist, the interval between successive impregnations should be extended, so as to allow at least a year's rest. Sometimes a few precursory signs, such as restlessness, switching of the tail, turning to the flank, abnormal foetal movement, and possibly some straining, may be observed, and prompt action should be taken to suppress them. First and foremost, the animal should be isolated in a darkened stall and kept as quiet and comfortable as possible. The food should be concentrated and easily digested, the water should be pure, and in cold weather the body should be amply covered. If labor pains are apparent, have the belly gently hand-rubbed. Impending abortion may be checked in this way, particularly if sedatives are administered at the same time. When the pains are severe, and cannot be allayed in this way, there is very little hope of saving the life of the foetus. Although the contagious form of abortion affects larger numbers of stock at any one time, and is therefore more to be dreaded, I do not propose to discuss it on this occasion, as I hold the opinion that it should only be dealt with under the guidance of a qualified veterinary surgeon. It is sufficient for the present purpose to instance it as one of the most important sources of unfruitfulness in cows and mares, and to state that the institution of proper measures will enable us to control its effects.

Management of Pregnant Animals.

In the management of pregnant animals, apart altogether from the danger of abortion, we have to consider the general preparation of the mother and young for the act of delivery and their subsequent welfare. There are no special laws to propound, but the rules that apply generally to all stock must be more rigidly observed with pregnant animals. The precautionary measures already cited in connection with abortion apply generally throughout pregnancy. In addition, I would point out that the greatest losses invariably occur where stock are pampered. All pregnant animals are improved in general health by exercise. Working stock should be kept at their customary duties until within three or four weeks of full term, and in my experience they are all the better if given light duties to within a few days of parturition. To some extent this depends upon the temperament, animals of a placid and lymphatic type being safe to work later than those of a more excitable nature; but there are a few cases in which slow work will not prove beneficial towards the end of pregnancy. Even pregnant sows are all the better for a run at pasture throughout gestation. The tendency towards obesity should be guarded against, especially in the early stages of pregnancy, when

there is a tendency for the mother to lay on condition at the expense of the foal. The diet should be made richer and less bulky as development proceeds, and the bowels should be maintained in a healthy condition. Milking cows are commonly milked right up to calving if they are yielding well, but having regard to the interest of the calf, it would be better practice to dry them off during the seventh month, and regulate the feed according to the condition, in order to guard against milk fever. As the date of parturition approaches, pregnant animals should be turned into a field, when they can be kept under close surveillance in case of accidents. Flocks of lambing ewes and sows about to farrow should be disturbed as little as possible.

Management at the Time of Parturition.

A little assistance is often required at parturition with all kinds of domesticated animals, and if given in good time, a difficult and perhaps fatal complication may be obviated. It is most important to attend to the young as soon as delivery has taken place: not infrequently they are born in an exhausted condition, and require to be promptly stimulated, in order to enable them to hold on to life. First see that the nostrils are not covered with membrane or blocked with mucus; next set about strengthening the respirations by moving the tongue in and out, blowing violently into the nostrils and mouth, working the limbs, and applying brisk friction to the body surface. Weak respirations may be strengthened by administering a little brandy and water. The cord must be examined to see if it is broken or is still intact. If broken off about the right distance from the belly, and if hemorrhage is negligible, it is sufficient to wash the stump. If, however, it is unbroken, or if the stump is bleeding profusely, it must be ligatured. Before severing the unbroken cord, it is important to notice whether the afterbirth is still adhering to the mother or not; if it is, the cord must be ligatured in two places and severed in between, otherwise the dam may suffer the loss of blood which she can ill afford to spare. At the moment of parturition, a little gentle traction is usually all the assistance that the mother requires. When difficulties arise, the bowels and bladder should be emptied, the passage well oiled, and such help in correcting abnormal presentations and positions as the stockman's experience and skill will enable him to offer, should be given, with due regard to the importance of cleanliness throughout the operation.

Management of Animals after Parturition.

Immediately after birth has taken place, the dam should be allowed to rest, except in cases of extreme exhaustion, when a stimulant should be at once administered. One of the first cravings of the mother will be for a drink of water, and when this has been satisfied, she will usually attend to her offspring. The mother's chief needs at this time are an ample supply of milk-producing food and plenty of fresh water. The cleanings need not be interfered with for a while, but if they are not shed naturally within 12 hours of birth in the case of mares, and 24 hours for cows, they must be carefully separated and removed. If the milk flow be deficient, diet should be a mixed one, consisting of green grass or lucerne, with chaff, crushed oats and bran fed damp. An occasional mash of bran or boiled barley is also helpful.

Mares should be given three or four weeks complete rest after foaling, and if, when put to work, the foal is not allowed to accompany its mother, it should not be permitted to suckle her till she has cooled down and had some of the heated milk in the udder withdrawn. Foals should be allowed to suckle at least three times a day during working hours; if long periods elapse between meals, digestive disorders ensue as the result of engorgement. The function of the first milk or colostrum is the same in all classes of stock—it acts as a laxative, serving to clear the passage of the accumulated and often inspissated secretions which block up the lower bowel. To assist this action it is a common practice in some stables to give all foals a dose of oil within a few hours of birth.

This brings me to the conclusion of my remarks upon unfruitfulness in livestock. I have indicated some of the chief reasons why our flocks and herds do not multiply more rapidly, and I also have endeavored to point out to what extent and in what manner those in charge of breeding stock may exert themselves to maintain this loss through breeding troubles at the lowest possible minimum. In so doing, I have attempted to place before you certain facts that should prove at once interesting and beneficial to all who are interested in the breeding of livestock.

WHITE ANTS.

To prevent ants from working their way into a wooden building it is essential that the building should be erected upon jarrah or red gum stumps, the ends let into the ground being first well charred with fire, and tarred in addition if possible (says Mr. J. Paull, Field Engineer). The top of the stumps should be sawn off horizontally at floor plate level, and a strip of flat galvanized iron (projecting 3in. or 4in. beyond faces of stump all round) be secured to them. Should the white ants work their way up the stump, the galvanized iron will stop them. The floor plates should then be secured to the stumps on top of the galvanized iron. As an additional precaution the floor joists are often payed over, especially the ends, with a white ant exterminator, also the under side, and joints of flooring boards, bottom lengths of studs, &c.

The main thing to look out for is that plenty of light and air can circulate under the building. On no account whatever should any earth be in contact with the timber.

SOLANUM ROSTRATUM.—A NEW WEED PLANT.

[By Professor T. G. B. Osborn, M.Sc.]

Solanum rostratum (Dun.), a plant from the south and west of the United States of America, has recently been sent into the Department of Agriculture as a weed by the District Council of Ninnes. As this

is apparently the first record of the plant in South Australia, a short description may be useful to assist farmers and others interested in limiting the spread of undesirable weeds to recognise it.

The plant is an annual and grows erect, with stems as much as 2ft. high, branching freely. It is thickly covered with yellowish star-shaped hairs, and also numerous yellow, spine-like prickles. These

latter are often nearly half an inch long, and make the plant very objectionable to handle, either green or dried. The leaves are oval in shape, irregularly lobed with two or three deep indentations on each side. They, too, are prickly along the main veins.

The flowering clusters are freely produced at the side of the stem, the flower stalks being exceedingly prickly. The calyx also is densely covered with prickles; it remains after the petals have fallen, and almost completely encloses the berry. The fruit thus is an intensely prickly burr, an inch or so in diameter, including the spines. It is thus unlike the tomato-like berry of the Sodom apple and other solanums.

The petals are five in number, and form a yellow star. One of the stamens is much longer than the remaining four, and curves upwards at the front (anterior side) of the flower. From this feature the specific name *rostratum* (beaked) is derived.

Solanum rostratum has received a number of popular names, the most general in its native United States being buffalo burr, a name given it by the pioneers from its prevalence around old buffalo wallows in the prairie States. Other names are pincushion or spiny nightshade, sand burr, Texas or Mexican thistle. The names are all more or less descriptive of the main characteristic of the plant—its spininess.

Though new to South Australia, the buffalo burr was first recorded in Australia by Mr. Maiden, in New South Wales, in 1904. In 1910 Professor Ewart recorded it for Victoria under the name of *Solanum heterandrum* (Pursh).

Since the plant is an annual, and seeds freely, there is every reason to expect its rapid spread in the State unless care be taken to destroy it before it becomes established. It is said to behave as a "tumble weed" in the United States, the stem breaking off from the root and being blown along before the wind. In its progress the seeds are shed, in a manner familiar to those who know the "roly-poly" (*Salsola kali*) of the north and saline areas in this State. Buffalo burr might become a serious nuisance, especially upon waste places in districts where the soil is light and sandy. Like all solanums, it is more or less poisonous, but its spininess will prevent stock or children from eating it.

Plants of buffalo burr should be pulled up before they fruit. A year's seeding in this, as is many other cases, is likely to mean many years' weeding.

BREEDING HORSES.

CARE AND ATTENTION NEEDED.

The Government Veterinary Lecturer (Mr. F. E. Place, B.Sc., M.R.C.V.S.) recently delivered an address before the members of the Coonalpyn Branch of the Agricultural Bureau on the subject of the care and attention of breeding horses. Mr. Place said:—

The first and chief necessity is a breeder's eye—that is, a native knowledge of the habits of the animals in one's care. They each have their individual peculiarities, which must be the object of study by the breeder, and it is not given to every man to become a breeder in a successful way, simply because he does not live in sufficiently close touch with his stock; and this is especially the case in South Australia, where the team is regarded too much in the light of being a tractive force rather than attractive creatures.

One can lay down no hard and fast lines or code of rules to be followed in breeding, because success in that line is a matter of individuality and fitness in its broadest sense. One man will fail with the best of animals at command, and another will command success from the most unpromising material by careful observation of individual characteristics and by culling ruthlessly.

If the sheep industry of South Australia had been carried on after the lines of horse breeding in this State, it would not be where it is now; a very moderate ram worked to death on inferior ewes would not build up studs of world-wide renown; and yet a low-priced stallion is supposed to be able to serve an unlimited number of mares of all sorts of nondescript types, and leave a good number of well-shaped foals. It is not in the nature of things that this should be.

The constant acquisition of new facts forcibly brought before one by the failures of the past is perhaps the most salient point in a breeder's passage from inferiority to success, and if a man cannot profit by the lessons dearly learnt he will never make a successful breeder. What those lessons will be will appear with startling distinctness, especially in a district in which the industry is comparatively young; but at the same time mistakes can be, perhaps, more cheaply remedied in a young country than in an old-established district where the amount of capital invested in breeding controls to a great extent the fashions to be followed.

Failures.

Failures are often attributed to the force of heredity, and it may be so, especially when the fault lies with the human factor, who is ever ready to blame anyone but himself. It sounds well to bow the head beneath the martyr's crown, and blame the force of heredity for faults in one's own methods. It should be borne in mind that the successful lines were founded and fixed by men who troubled their heads little about this ism or that ology, but who had a keen eye for beauty, and

knew the form they wanted when they saw it; so they eliminated weaknesses of constitution and special defects by mating the types they desired, regardless whether they conformed to the mathematics of one ism or the geometry of another. Far be it from me to decry the value of scientific observation, that infinite capacity for taking pains which leaves the world the richer by many facts of value; but it does appear to me that in South Australia there is too much of the Greek philosophic spirit, the desire to worship the unknown, and too little of Roman sturdiness, the will to better conditions as we find them. In horse breeding, in particular, the blunt adoption and improvement of things as they are will be more profitable than the seeking after ideal perfection that is unattainable. To hitch one's wagon to the stars often involves a nasty fall when the rope snaps, and he who follows the furrow avoids that, even if his gear is faulty.

The advantages of free crossing or the failures of in-breeding may well form the subjects of academic discussion, but the fact remains that in a district such as Coonalpyn, if one wants to breed, one has to take the stallion offering, and mate him with the mare as she is. But that is no reason why the stallion should not be the best obtainable, and that as the mares come on they should not be each generation better than the last. Individual keenness will do much, but co-operation will do more. Some six years ago Professor Lowrie laid before Congress his scheme for breeding clubs or societies, and with but one or two exceptions his sound business proposition fell on deaf ears. In years to come another Pharoah will arise who knew not Joseph, and people will say "How wise; why was this thing not done before?"

Districts like Coonalpyn are essentially those in which the provision of a good sire by co-operative effort would quickly respond by the betterment of the stock.

A horse that is shapely and sound, full of pluck and good temper, is not picked up cheaply at any time, and a club could better afford to obtain such an one than an individual. I know that "so many men, so many opinions," holds good; but if so many men are out to get a good horse, the differences in their opinions are an advantage rather than otherwise, for they will represent the general average.

The Care of the Horses.

Having got your horse, keep him well. Nothing has shocked me more than the disgraceful conditions under which really good stallions are kept in South Australia during the off season, in close, dark, dirty stables, deprived of exercise, light, and air. They lay on fat, so that they come out in the spring like grubs that have lived underground. Then they must have physic to brighten their coats, sweating rugs and lots of grooming in order that they may shine and take the eye with their fat.

Let the horse live a natural life, with the collar on his neck, free to breathe fresh air and revel in the sunshine. No matter if his coat be long, so that it lies down and glistens; he will soon shed it when the spring comes, and then under his short coat the outlines of his muscles will stand out as if carved in marble, springy as steel. He will not

girth as much round his belly as the blubber carrier, but round his heart, whence comes his pride, he will girth more. The stallion as a worker shows what his stock will be, and his temperament depends to a great extent on his upbringing. He learns bad manners from his groom; if he is handled firmly and kindly as he grows up he is a horse, not a man-eating beast.

The Mare.

The mare is as we find her, but if she is a fair average type she will drop foals that will be a credit to her if the sire is better than she is. While she is in foal she should live a natural life, working fairly right up to the time she foals. Should she in stony or stumpy country? Yes, certainly, if commonsense is used in loading her. She should not be squeezed in the middle of the team, but, where possible, have the off side place, and be the one horse too many in the team; it is far better that than the team should be under horsed, and she straining to do more than her share. If she is young, remember that she has to develop herself as well as provide for the growing foal, so that her feed should be generous and her work divided into comparatively short periods. Over-long working, as at seed time, is the worst thing that can happen to a mare. The weariness induced has a very bad effect both upon her and the coming foal: while, on the other hand, they both benefit by fair and regular work. Generous feeding does not mean one bag of cocky chaff and two bags of sand, but good chaff and bran, and when oats are cheap a few pounds of crushed oats gradually added as she grows heavy.

As foaling approaches, salts and so forth may be needed occasionally, but bran, clean hay, natural grasses, or moderate amounts of lucerne or berseem will be much more valuable.

Foaling.

Where should the foal be born? In the open whenever possible. Look at the mare in her free state: she wanders off to some secluded lair, where water and feed can be had easily, and nurses her foal and herself away in the quiet. Out in the open she can put forth those very strong muscular forces which parturition implies, which she is often afraid to do when cooped up in a not too roomy box shared by mouse-eaten bags, super., drill boxes, and an odd roll or two of barbed wire, because her owner is anxious for her welfare: just as if the stars of heaven and the grass dew laved are not clean enough cover and bed for both dam and foal. Many a mare goes wrong in the foaling because she is shy, and frets at the constant worry of a man with a lantern. He never used to come prowling round before, and now, when instinct tells her to get quietly away by herself, every few hours he is poking around. If she must foal indoors, have a peephole through which you can see her without disturbing her.

Foaling is a very quick physiological act, and should require no assistance; those cases that do are outside the scope of this lecture, as they are entitled to detailed consideration. Interference with the navel is only desirable when, owing to extreme toughness, it does not break, when it may be taken round the fingers of each hand and torn

apart. It is better to do this than to cut it, as bleeding is avoided. When navel ill is about a district, it is well to dip the end in tincture of iodine, but tying is never desirable, as a dirty bit of tape or string will hold more germs than it will keep off.

Cleaning should take place in a few hours, and if the afterbirth has not then come away, take a split stick and wrap the darker inner part of the cleaning round it, rolling with a steady strain, until the outer, lighter, thicker part disappears inside. In a few moments all will come away cleanly, without internal interference, which is never desirable, although sometimes necessary when the cleaning has remained too long and become putrid.

Should the foal not suck, see that its bowels are open. Removal of the foal dung or meconium by the finger dipped in glycerine will bring this about, or in obstinate cases a small enema of warm soapy water.

Dislike to let the foal suck will involve many ingenious plans, but in the case of a nervous young mare a good sedative dose, such as 2oz. of laudanum, will bring about a drowsiness of which the foal will soon take advantage. Fomenting the udder with warm water and applying glycerine is sometimes necessary.

Working the Nursing Mare.

Work is the making of the in-foal mare, but the undoing of the nursing mare and foal as well. If she is indispensable, then it is better to wean the foal early, for nature soon dries up the milk when at work, and hunger will drive the foal to eat. But if one is breeding for the sake of getting good horses, work must be so arranged that the nursing mare has nothing to do but look after her foal.

The foal heat comes on about the ninth or eleventh day, and lasts three days; after that she comes in heat every three weeks, and remains on heat for a week. It is better to put her to horse at the foal heat, when the great majority of mares that breed every year will conceive; but after that they are very uncertain while suckling their foal, often taking the horse freely, but not holding him, and thus throwing one's calculations out as to the time of foaling, which may be taken as 48 weeks from the time of conception.

Mating.

The psychology of horse breeding receives but scant attention. It is known that a stallion will nick better with certain mares than with others; but the fact that the sire and dam have any choice in mating is generally ignored, though in the free state the way the stallion selects and protects his mares, and has his favorites even among them, is very marked, and mares, too, have a preference of mate which the average farm breeder takes no notice of. So that it is a poor policy, from a breeder's point of view, to force a stallion to serve an unwilling mare; the resulting foal, if there is one, will not be vigorous and lusty.

When the mare is in the middle of her heat one mating will ensure conception, and it is a needless waste of energy to give more. A little care and calculation in this respect will enable a stallion to leave a

bigger percentage of foals, and those better ones than is the case where he is overworked on a less number of mares.

Granting that the mare is well in season, the stallion should be led up to her sideways, so that if she lets out he escapes the blow, and if this precaution is taken, sidelines and so forth can be dispensed with.

Wearing journeys, unhealthy stables, too many mares at one place, too few at another, and he often gains a reputation for being an uncertain foalgetter, simply because he is too busy early in the day and tired at the latter part.

On the other hand, if he is not overworked early, he is more likely to stop his mares when they come to him at the end of a day's work than when they are served early in the day and go straight to work.

Allowing for the best procurable, both sire and dams, the character of the land and climate have much to do with the fixing of type; and no greater mistake can be made than violent outcrossing with a view to suddenly improving a type, and the suitability of surroundings must always be considered when choosing a foundation type.

A Type for the District.

In a district such as Coonalpyn, where there is a tendency to grow weedy, because of the newness of the pasturage, it will be better for some years to come to breed on lines that lean to lowness and compactness, rather than look to an immediate raising of the standard. Therefore, with the class of mare available, I would suggest a stallion reared in a colder and wetter district, such as the lower South-East, rather than from the north, and because the mating of widely different types is never a success, he should be a compact horse of massive character. Because "like produces like," his pedigree should be reliable, in order that he may make his mark and leave his stamp upon his stock, such prepotency laying the foundation for future improvement, which should be more on the side of uniformity than of certain markedly better foals. A gradual raising of the standard will be far more profitable, both from the point of view of work or sale, than will be the possession of one or two fine specimens.

Then, too, there is somewhat of the formation of a new type to be considered, what in England at the present moment they are talking of as the "light heavy horse," and to fix such a type inbreeding must play its part. Type can be safely bred to with near relations when they are sound, but it is fatal to do so when they are not; a word to the wise is sufficient. Type can only be ensured from sound stock.

It is generally thought that the sire influences the shape, and the dam the temper and constitution. I do not think much value can be placed on this; but certainly when the sire is really masculine, as he always should be, he will leave his mark, and when the mare is a good brood mare she will transmit a feminine character to her fillies.

One reason why the thoroughbred has advanced more than the draught breeds is that the course is a more practical test than the ring. In the former to be the dam of a winner is to have an enhanced value, while in the ring a good mare may be quite a poor female, and yet have a long winning career. On the course the masculine female will win, but not be the dam of winners.

In endeavoring to fix a new type suitable for a district, it is often advisable to put a colt on the mares of that district, as he leaves a more vigorous impress of his style than does an old horse.

SHELTER.

Shelter is a point that in a wind-swept country must not be neglected, and it is curious to notice on a cold, windy, and wet night horses will get to leeward of a shed, but not go in. They seem to have an instinctive preference for sleeping out; so that in a district such as the one under consideration, a hay or straw stack is much to be preferred. They can choose which side they like, they can tear out bedding if they wish, and can take a bite whenever they feel inclined.

Food comes last, but by no means least, for consideration. Coonalpyn with its limestone produces fodder very deficient in lime salts, especially the phosphates—salts absolutely necessary for the production of bone and size—and unless they are available breeding will never be a success. There is no reason why it should not be. They cannot be regularly supplied in artificial form, such as licks and so forth; but calcium is especially abundant in leguminous hays, in which phosphorus is also found freely when the seeds are in the hay, and in the growth of clovers, vetches, and so forth lies the keynote.

EXPERIMENTAL FARM HARVEST REPORTS.

[By W. J. SPAFFORD, Superintendent Experimental Work.]

2.—VEITCH'S WELL EXPERIMENTAL FARM.

(Manager—Mr. L. SMITH.)

This farm is situated in the hundred of Allen, 158 miles from Adelaide, on the Loxton Railway. It contains 3,800 acres of land, the bulk of which is sandy, the remainder running to shallow light loam soils overlying hard limestone rock—conditions similar to thousands of acres of surrounding country.

THE SEASON 1916.

The year opened with but little rain for the cleaning of the fallows; January, February, and March together only produced 31 points, whilst the average for this period is 2.59 inches. At this particular farm this dry period was not a very great disadvantage, as the soils have not been cropped often enough yet to be very dirty with weeds. April also had very little rain, only 20 points being registered. During the next month (May) when good germinating rains are expected and are the rule, only 43 points fell as against an average of 1¼ inches, but the weather was such, and the falls so split up, that the seed germinated well de-

spite the lack of total rain. From June onwards, right throughout the year no further trouble regarding rains was experienced, and every month showed rain in excess of the farm average for the same period. These rains were so good that a record yield, very much in excess of all previous crops secured, was harvested notwithstanding the fact that very poor seeding rains fell. The table following sets out in detail the rainfall registered at this farm since 1909:—

Rainfall Distribution at Veitch's Well, 1909-1916.

	1909.	1910.	1911.	1912.	1913.	1914.	1915.	1916.	Means, 1909-1916.
	In.	In.	In.	In.	In.	In.	In.	In.	In.
January	0·56	0·26	0·84	—	0·10	0·31	0·48	0·18	0·34
February	0·19	0·32	3·17	0·29	2·67	0·56	—	0·03	0·90
March	0·66	4·78	0·65	0·30	3·22	1·06	—	0·10	1·35
April	0·15	—	0·03	0·18	0·14	1·01	0·51	0·20	0·28
May	3·03	2·16	1·32	—	1·23	0·52	1·33	0·43	1·25
June	2·48	2·09	0·90	3·95	—	0·35	1·91	1·97	1·71
July	1·73	1·41	1·11	1·09	0·53	0·38	0·63	2·43	1·16
August	2·24	0·58	0·66	1·25	0·67	—	1·67	4·01	1·38
September	1·78	2·34	2·13	1·33	3·22	0·15	1·99	2·57	1·94
October	0·56	0·88	0·36	0·34	1·80	0·15	0·56	1·64	0·79
November.....	1·07	0·69	0·77	2·05	0·68	1·10	0·19	2·04	1·07
December	—	0·68	1·42	0·79	0·69	0·65	0·56	1·09	0·73
Total	14·45	16·19	13·36	11·57	14·95	6·24	9·83	16·69	12·91
Total "Useful" Rain (April to November) ...	13·04	10·15	7·28	10·19	8·27	3·66	8·79	15·29	9·58

"USEFUL" RAINFALL AND ITS DISTRIBUTION.

It is a fact of common knowledge that it is not the total rain that falls during a year so much as the distribution of that rain which determines what the cereal crops shall be. To be able to see clearly what the distribution of the rain was it is necessary to divide the time that the crops are growing into periods which we know by experience play a very important part in the crop growth. The table below sets out clearly what was the distribution of the "useful" rainfall for the past season:—

Distribution of "Useful Rainfall in 1916 comparatively with the Means from 1909-1916.

	1916.	Means from 1909 to 1916.
	In.	In.
Seeding rains (April-May)	0·63	1·53
Winter rains (June-July)	4·40	2·87
Spring rains (August-October)	8·22	4·11
Early Summer rains (November)	2·04	1·07

As a rule, in our wheat-growing areas, particularly in low-rainfall districts, the distribution of rain that we look for to grow crops is some-

thing as follows:—(1) Fair seeding rains to germinate the seed and give the young plants a good start; (2) quite twice the seeding rains during the winter (June-July); (3) fair rains again throughout the spring months (August-October); and (4) a couple of rains during the early part of November. In the later and better districts the late spring and early summer rains need to be more plentiful, and extended later into the year. These period rains all play an important part in what the crop will be, and in the average year the "seeding" rains, providing the others come in some sort of regularity, without big gaps between the falls, appear to have the greatest influence on the crops. When the seeding rains are lacking it usually takes good winter and good spring rains and an extended season to make up for the deficiency. This is what happened this year, as a glance at the above table will show. Seeding rains were poor, winter rains good. Spring rains remarkably good, and early summer falls also heavy. This distribution of the rains and the total "useful" rain counteracted the lowness of the "seeding" falls, and the farm ended the season with its record yields. The comparatively large amount of rain recorded in early summer, accompanied as it was by exceptionally cool weather, had the inevitable result of producing very rank crops and delayed their ripening, with the result, even in a district like this with its low average fall, of badly lodging all varieties having a tendency this way.

Crops.

Again this year the only crops grown were the cereals wheat, oats, barley and rye, and in all cases, except the small area of rye, which was sown on autumn ploughing, were grown on fallowed land.

Hay Crops.—The crops for hay were sown in Field No. 5, which was ploughed from August 20th to September 21st, 1916, and worked throughout the year as bare fallow. During the period April 15th to 25th about 112 acres were drilled in, composed of approximately 37 acres Algerian oats, 40 acres Baroota Wonder wheat, and 35 acres King's Early wheat. Each block was drilled in with 60lbs. seed and 1cwt. superphosphate to the acre. In Field No. 6 about nine acres of Silver Baart wheat which was rather rank was cut for hay, and together with a little more than five acres of headlands, brought up the area cut to 127.08 acres. As was pointed out under the heading of "rain distribution" the season favored strong growth, and this was shown by the hay return, which totalled 243 tons (stack measurement) from the 127.08 acres, or an average yield of 1 ton 18cwts. 27lbs. per acre. That this is remarkably good for the district is easily realised if it be compared with the average hay return for the farm from 1910 to 1915, which was only 12cwts. 37lbs.

Hay Returns—Veitch's Well, 1910-1916.

	Rainfall.	Area.	Total Yield.			Yield per Acre.		
	In.	Acres.	T.	C.	L.	T.	C.	L.
1910	16·19	82·00	82	0	0	1	0	0
1911	13·36	121·50	74	18	0	0	12	37
1912	11·57	218·00	109	0	0	0	10	0
1913	14·95	140·00	70	0	0	0	10	0
1914	6·24	100·00	—			Total failure		
1915	9·83	158·00	180	0	0	1	2	88
1916	16·69	129·51	243	0	0	1	18	27
Means	12·91	—	—			0	16	22

Oat Crops.—For the first time oats were grown as a crop for grain. Part of Field No. 5, consisting of about 13 acres, was drilled in with 1½bush. of seed and 1cwt. superphosphate to the acre with Algerian oats. This crop made very good growth, and really would have been a better hay than a grain crop, but the yield of 478bush. 37lbs. from an area of 12.39 acres, or an average yield of 38bush. 26lbs. to the acre, is highly satisfactory.

Barley Crops.—One of the 6-rowed types of barley was grown again this year, but under much better conditions than was the case the previous year. Between May 4th and 7th about 20 acres of Field No. 5 were drilled in with barley at the rate of 50lbs. seed per acre with 1cwt. superphosphate and made good growth throughout the season. The yield of 517bush. 20lbs. from 20.10 acres, or 25bush. 37lbs. per acre, is no criterion of what the crop was. It was so rank in places that it lodged very badly, with the result that only a portion of the grain was secured.

Barley Returns—Veitch's Well, 1915-1916.

Year.	Rainfall.	Area.	Total Yield.		Yield per Acre.	
	In.	Acres.	Bush.	lbs.	Bush.	lbs.
1915	9·83	22·72	248	91	10	46
1916	16·69	20·10	517	20	25	37
Means	13·26	—	—		18	16

Rye Crops.—Only a very small plot of rye was sown. This was harvested for grain, and from an area of 0.36 acres, 3bush. 12lbs. was collected for an average of 8bush. 53lbs. per acre.

Wheat Crops.—Quite a number of varieties of wheats were sown this year, the seed of most of them being graded pure type seed from Roseworthy. As most of these varieties only occupied comparatively small blocks, it will not be until the 1917 harvest that pure type seed will be available for distribution from this farm.

Field No. 5.—As was pointed out when dealing with the hay, this field was not ploughed until the period August 20th to September 21st, and from then on till seeding operations, was worked as circumstances demanded. Besides carrying hay, oats, and barley a number of varieties were drilled into this field, all at the rate of 60lbs. seed and 1cwt. superphosphate to the acre, and they behaved as follows:—

Wheat Varieties in Field No. 5, 1916.

Variety.	Area. Acres.	Total Yield. Bush.	lbs.	Yield per Acre. Bush.	lbs.
Federation	2·57	66	16	25	47
Queen Fan	2·57	58	57	22	56
Baroota Wonder	2·50	53	48	21	31
College Eclipse	2·62	53	12	20	18
Yandilla King	12·34	249	40	20	12
Walker's Wonder	2·52	47	6	18	41
Silver Baart	2·57	47	16	18	24
Cumberland	2·57	47	15	18	23
Late Gluyas	2·59	46	20	17	53
Gluyas	2·59	43	47	16	54
King's Red	2·57	41	30	16	9
Bearded Gluyas	32·74	456	29	13	57
Red Russian	1·33	17	33	13	12
Baroota Wonder	2·00	12	4	4	38

Field No. 6.—This field was ploughed between July 23rd and August 19th, and from then on till seeding time was kept free from weeds and from surface crusts. From April 26th to May 13th wheat was drilled into this field at the rate of 60lbs. with 1cwt. superphosphate to the acre, and the following varieties were used:—From April 26th to May 4th about 113 acres of Silver Baart; from April 29th to May 4th about 46 acres of Cumberland; from April 21st to May 6th about 37 acres of Federation; from May 5th to 9th about 59 acres of Yandilla King, and from May 8th to 13th about 87 acres of Baroota Wonder. In this same field experimental plots with Silver Baart wheat—details of which are shown later—were drilled in between May 1st and 3rd.

The results from the various wheats grown in this field are to be seen in the following table:—

Wheat Varieties in Field 6, 1916.

Variety.	Area. Acres.	Yield. Bush.	lbs.	Yield per Acre. Bush.	lbs.
Federation	36·75	938	30	25	32
Yandilla King	59·37	1,266	23	21	20
Baroota Wonder	87·09	1,439	17	16	32
Cumberland	46·24	754	29	16	19
Silver Baart	93·45	1,280	16	13	42

The yields per acre of the wheat grown at this farm since its inception in 1908 have been kept, and these, with the farm average for the eight years, are to be found in the following table:—

Wheat Returns—Veitch's Well, 1909-1915.

Year.	Rainfall. In.	Area. Acres.	Total Yield. Bush. lbs.	Yield per Acre. Bush. lbs.
1909	14·45	22·06	396 0	18 0
1910	16·19	197·50	2,156 0	10 55
1911	13·36	620·90	5,080 30	8 11
1912	11·57	569·00	5,544 18	9 45
1913	14·95	791·40	4,742 28	6 0
1914	6·24	951·00	325 30	0 21
1915	9·83	602·41	6,681 51	11 6
1916	16·69	407·74	7,102 20	17 25
Means	12·91	—	—	10 13

The returns obtained from individual varieties at this farm comparatively to the general farm average for the separate years are shown below:—

Yields of Varieties of Wheats—Veitch's Well, 1910-1916.

Variety.	1910.	1911.	1912.	1913	1914.	1915.	1916.	Means. 1910-1916.
	B. L.	B. L.	B. L.	B. L.	B. L.	B. L.	B. L.	B. L.
Baroota Wonder	24 0	7 55	8 29	8 27	1 18	12 43	16 20	11 19
Yandilla King ..	21 0	6 0	9 14	9 6	Failure	10 2	21 8	10 56
Federation	16 41	8 16	10 53	5 48	0 1	6 48	25 33	10 34
King's Early	15 0	7 5	9 38	1 26	Failure	13 26	16 9	9 23
Cumberland	14 27	9 23	11 5	6 15	0 7	7 51	16 26	9 22
Silver Baart	9 30	8 9	8 8	6 41	0 19	9 48	14 13	8 7
Queen Fan	—	—	—	—	—	—	22 56	—
College Eclipse..	—	—	—	—	—	—	20 18	—
Walker's Wonder	—	—	—	—	—	—	18 41	—
Late Gluyas	—	—	—	—	—	—	17 53	—
Gluyas.....	—	6 56	9 54	5 4	—	—	16 54	—
Bearded Gluyas.	—	—	—	—	—	—	13 57	—
Red Russian ..	—	—	—	—	—	—	13 12	—
Farm average ..	10 55	8 11	9 45	6 0	0 21	11 6	17 25	9 6
	In.	In.	In.	In.	In.	In.	In.	In.
Rainfall.....	16·19	13·36	11·57	14·95	6·24	9·83	16·69	12·91

EXPERIMENTAL PLOTS.

Most seasons, manurial and rate-of-seeding tests with wheat have been conducted on the farm, and for the past two seasons these experiments have been conducted on the same, so that the results can be tabulated together, and will possibly prove useful until permanent experimental plots are in going order. Silver Baart wheat was used this sea-

son in both series of plots, and the results for the past two seasons are to be seen in the two tables following:—

Quantitative Fertiliser Tests—Veitch's Well, 1915-1916.

Tests on wheat sown at rate of 60lbs. per acre—

Fertiliser per Acre.	1915. Bush. lbs.	1916. Bush. lbs.	Means, 1915-1916. Bush. lbs.
No manure	11 52	13 39	12 45
½cwt. superphosphate	13 15	17 7	15 11
¾cwt. superphosphate	—	17 40	—
1cwt. superphosphate	13 43	18 49	16 16
2cwts. superphosphate	13 40	18 32	16 6
3cwts. superphosphate	13 19	21 31	17 25
Farm average	11 6	17 25	14 15
Rainfall	9·83in.	16·69in.	13·26in.

Quantitative Seed Tests—Veitch's Well, 1915-1916.

Tests on wheat sown with 1cwt. of superphosphate per acre.

Seed per Acre.	1915. Bush. lbs.	1916. Bush. lbs.	Means, 1915-1916. Bush. lbs.
30lbs. wheat	9 47	18 9	13 58
45lbs. wheat	10 9	19 1	14 35
60lbs. wheat	10 45	19 5	14 55
80lbs. wheat	9 57	18 39	14 18
Farm average	11 6	17 25	14 15
Rainfall	9·83in.	16·69in.	13·26in.

SOILS OF THE SOUTH-EAST.

DRAINAGE, LIMING, AND CULTIVATION.

At the Conference of South-Eastern Branches of the Agricultural Bureau Mr. L. S. Davie (manager of the Government Experimental Farm at Kybybolite) delivered the following paper, giving impressions gained from experience in working land at Kybybolite. Mr. Davie said:—

In character the Kybybolite soils range from chiefly light loams to heavy loams overlying ironstone gravel on a stiff clay subsoil, but the layer of ironstone gravel is not always present. We also have a fair percentage of what is known as crabhole country, which has a large percentage of clay in the surface layers. The particles of soil are very fine, and they tend to run together under wet conditions, and to set extremely hard when dry. The winter rainfall of the district

is fairly heavy, and the nature of the soil, together with the general flatness of the country, tends to a more or less waterlogged condition during that period, the ground usually being saturated all the time. These natural conditions cannot give good results from pastures or from cultivated crops; the excess of water has robbed the soil of essentials necessary to fertility and good mechanical condition. The unsuitable mechanical condition is due to a deficiency in lime, the original supply of which has been leached out in those long periods in which the soils have been subject to saturation. The sourness of the soil is also due to this deficiency, which allows of the accumulation of injurious acids, produced from organic matter and from chemical reaction in the soil, and which require lime as a neutralising agent. Although lime dressings are necessary to produce the greatest degree of fertility in our soils, we cannot get satisfactory improvement from any application if we expose it to the same action as has already depleted the available supply; which brings us to the fact that drainage is the first necessity in the improvement of these soils.

Drainage.

Drainage will not only enable us to use lime, but it allows of proper aeration of the soil—a condition necessary to the chemical activity responsible for a large proportion of the available supply of plant foods. On the Kybybolite Farm, Mr. Colebatch inaugurated a system of open drains for carrying off the surplus water, which is cheap, and within the reach of all who are alive to the benefits to be obtained. We now have 19 miles of these drains, which are situated so as to take off the excess water as quickly as it is possible to do so. The open drain, although going a long way towards the desired end, cannot possibly be as effective as the more complete systems of older countries, and the relative cost and effectiveness of different methods will probably be tested at Kybybolite in the future. The effect of drainage is to remove the main factors hostile to fertility, and we are then able to supply the deficiencies of the soil. The main requirement is lime, which we previously noted, and this will now give its maximum benefits. Following drainage and liming we get a wonderful improvement in the mechanical condition of the soil, which will allow of better methods of cultivation, an important factor in improving fertility. We find that our soils will also respond well to dressings of farmyard manure; as an example, the first year's results from our permanent manurial tests with wheat which have been laid down on virgin soil, show 20bush. to 11bush. in favor of the best plot, including stable manure, as against the best result from any quantity of super. alone. Such a wide difference may not be maintained when the treatment extends over several years, but it goes to show what the addition of organic matter will do in the direction of increasing fertility.

Methods of Cultivation.

We have on the farm two series of permanent experiments dealing with cultivation methods, viz., a test of the different seasons for ploughing and fallowing, with more or less cultivation on the fallows,

and a depth of ploughing test. The difficulty experienced in working our soils at various periods of the year has led to a great variety of practice as regards cultivation, hence the necessity for the first-mentioned test. This test includes:—Annual cropping, alternate cropping without fallow; autumn fallow, without cultivation; autumn fallow with spring cultivation; autumn fallow with spring cultivation and summer cultivation. Winter Fallow—Winter fallow with spring cultivation; winter fallow with spring and summer cultivation. Spring fallow—Spring fallow with spring cultivation; spring fallow with spring and summer cultivation. Summer Fallow—Summer fallow with summer cultivation. The average results for four years have been in favor of spring fallow with one spring cultivation. The same treatment, with an extra summer cultivation, is only slightly behind, and very little above winter fallow, with both spring and summer cultivations. The results without fallow are much below these, and point to the fact that in the present condition of our soils, some form of fallow is necessary in average seasons. The figures up to the present also point to a danger of overworking fallows, thus producing that state at which they tend to run together and set down hard with the first rains. In the permanent depth of ploughing test, two years' results have been obtained. Last year they were in favor of the deepest ploughing in each season included in the test, *i.e.*, winter and spring fallow and autumn ploughing, but the average for two years has somewhat modified these results, making 4½in. and 7½in. about equal for first position, with 3in. ploughing still the lowest of any. The results do not extend over a sufficiently long period for a definite statement, but it would appear that ploughing to a depth of 4½in. is necessary, and certainly no harm will result from deeper workings. From experience gained cultivation methods have been confined to spring ploughing for fallow, and in this operation turning the ground up to a good depth, never less than 4½in. After the first spring working subsequent cultivations are restricted to those necessary to kill weeds. All land available is put under fallow, the cultivation helping to sweeten the soils. We do not need fallow from the point of view of water conservation, therefore spring-grown crops, grown on fallow to as large an area as possible, will help in the improvement of the soil to a large extent. Sorghums and millets are the most profitable of the fallow crops that have been tried up to the present, and although we cannot claim to have grown anything like heavy crops, the effect produced by the extra stock carried, the extra manure added with the crop, and the sweetening of the soil, together with the increased production of available plant foods through the extra cultivations, has a very definite value in future production. As our soils improve under the various treatments we are discussing, cultivation will become easier as we approach the ideal physical condition of soil, and then it is safe to say that fallow in this district will be unnecessary. At present we aim at keeping as much land as possible under cultivation, despite the difficulties of working, for the purpose of producing a more rapid improvement in the land, and, in consequence, considerable areas of stubble land are each year broken up for seeding.

I have mentioned the remarkable results accruing from the addition of organic matter to these soils, and for that reason, apart from the fallow crops before mentioned, the growing of crops to increase the stock-carrying capacity of the land is an important item. It is our fixed practice to sow certain green feed areas as early in the season as practicable, chiefly with a mixture of rye and oats, for the purpose of providing winter and early spring feed.

Kale Crop.

The best purely fodder crop we have yet grown is thousand headed kale. This is not a fallow crop, but is seeded in the spring, and is carried over two summers. The stock-carrying capacity of this crop is very great—in the vigorous growing periods it is enormous. A valuable point about it is that a good growth can be reserved for any time of the year that it may be specially required. This crop is therefore of great value in itself, and, for that reason, must commend itself to the district, but indirectly the great increase of stock carried will increase the soil fertility to an extent which will be realised in the succeeding crops, and must be realised by the farmer if he is going to make the most of his land. Peas have also proved a very profitable crop in our experience, and its well known soil-improving qualities common to all the legumes, make it specially applicable to our requirements. As we realise the importance of increasing the livestock carried on our land, the idea of feeding the grain produce more extensively to our stock will come into prominence. The high prices at present ruling for stock must emphasize this point from a purely money-making point of view. This is especially so in the case of oats, to the growth of which our district is suited, but the demand for which is limited. What better then than to increase the stock on the farm and feed to them—a profitable method, and also one which will greatly help in improved production all round.

Summary.

In summarising these remarks on Kybybolite soils we find—

Firstly.—That they must be drained.

Secondly.—The greatest improvement after drainage will be found in the use of lime. Until sufficient lime is present, the maximum results cannot be obtained.

Thirdly.—The most intense cultivation possible should be practised to sweeten the soils and increase the supply of available plant foods by means of aeration through the repeated workings necessary for the various crops, and to enrich the land by the manures used.

Fourthly.—The growth of the fodder crops from the practice of more intense culture will provide for an increase of organic matter through increase of stock carried, as will also the feeding of grain produce. Organic matter should be added in every way possible, as in comparison with any other single treatment it gives the greatest increase in fertility.

AGRICULTURAL BUREAU.

CONFERENCE OF SOUTH-EASTERN BRANCHES.

The annual Conference of the South-Eastern Branches of the Agricultural Bureau was held in the institute at Bordertown on Wednesday, April 4th, 1917. Mr. A. A. Fisher, President of the Tatiara Branch, presided. There were also present on the platform Hon. C. Goode (Minister of Agriculture), Mr. G. Jeffrey (Vice-President of the Advisory Board of Agriculture), Professor A. J. Perkins (Director of Agriculture), Mr. W. J. Colebatch, B.V.Sc. (Agric.), M.R.C.V.S. (Principal of the Roseworthy Agricultural College), and Mr. H. J. Finnis (Acting Secretary of the Advisory Board).

WELCOMING VISITORS.

The Chairman said that, being President of the Tatiara Branch, it was his honor and privilege to welcome the delegates and visitors to that conference. He was indeed pleased to see so many there. He trusted that the conference would benefit all of them. They were faced with terrible burdens, which they had to carry, and it was only by attempting to produce everything that they could produce themselves that they were going to meet the financial difficulties which were before them. They had, in Australia, the greatest and best land the sun had ever shone on; but so far their development had only just skimmed around the sea coast. They saw by the exhibits around the hall what the district could produce, and they should realise that almost every farmer could produce goods of the same character, and that would show the possibilities of their soil. He called on the Minister of Agriculture to open the Conference.

OPENING ADDRESS.

Hon. C. Goode, Minister of Agriculture, said that it afforded him very great pleasure indeed to have the opportunity of opening the Agricultural Conference in the South-Eastern District for the second time during his term of office. He hoped that the outcome of the Conference would be that they would all learn something. The man who went to a Bureau Conference thinking that he knew everything which was to be known, was not much use to the Conference. In the development of agriculture and the science in connection with that industry they had still a lot to learn. Although the Chairman had referred to the experts present there that day, he was sure that the experts recognised that they were really in school themselves. They did not claim to be "knowalls," and to have solved all the problems which were to be solved in connection with agriculture. All of those present could, by experiments on their own holdings, by improved practices, and by avoiding mistakes, do much in the direction of adding to their own individual resources, and to the welfare of the whole community. The Chairman had struck the right note when he said

that they had big problems in front of them, and if they were to bear the big burdens brought upon them by the war, it would be by winning increased wealth from the land. The Government would give special encouragement, so that the men on the land could make every possible success on their holdings.

Closer Settlement.

They should go in for closer settlement more in the future than in the past, because if they had to hold that country they had to populate it. During the last two years the Government had bought several estates, and they had bought one in the vicinity of Bordertown, the deal having been closed the previous day. In the Nalang Estate they would settle farmers, who would add to the wealth of the district and the prosperity of that town. They were pressing on with a vigorous policy along the River Murray reclamation areas, with the same object in view. With respect to the men who had gone to the front and come back partially maimed, they must see that they got profitable occupation—they must see that they had the opportunity to make a fair living in the future. They had at Pompoota a number of men who had been allotted blocks in connection with the reclamation areas. They were engaged in dairying. They hoped to be able to do a great deal along the banks of the Murray for the soldiers, and so contribute to the general welfare of the State. At Mount Remarkable they had established a soldiers' training farm, where cereal growing, stock raising, and mixed farming would be carried on. They had in Mr. Hodge, who was in charge, a capable man, who had been farming in that district under diverse conditions, and they were glad to be able to secure his services. He was doing good work.

Problems of the South-East.

In the South-East they had problems peculiar to the district. That end of the Tatiara was more fit for cereal growing and stock raising; but in the more fertile areas to the south—he referred more to the volcanic areas and the swamp lands, those which had been and still remained to be drained—there were possibilities of further development. It was not only to encourage the settlement of the people on the land, but also in the interests of the land, that every individual, although having only a small holding, should bring forth the greatest possible produce. He had heard it said that some landholders in the South-East were doing too well, and were content to go along in their own methods, earning sufficient for their own needs, and did not go in for intense culture as they might. That might be right, but he hoped that every man would recognise his duty to make the most of the land he occupied. Though a man, by the employment of more labor, intense culture, rotation of crops, or summer crops, might not see a very big profit for the extra labor, yet he should realise that he was contributing to the general wellbeing of the community and the wealth of the country. If they would only make that principle apply to their daily avocations, a great deal more could be done in the way of increasing production and augmenting the natural resources of the country. He did not know whether irrigation had been tried to the

extent it might in the South-East, but he had an inquiry from the South-East whether the Government would give assistance in putting in an irrigation plant in connection with a private individual's own holding. In the coming session the Government was bringing in a resolution to authorise the giving of financial assistance for the installation of individual pumping plants for people to develop their own holdings in that direction. It would, of course, be necessary for an officer to report whether the conditions were suitable, and whether he possessed an adequate water supply. Given those two conditions, the Government was satisfied that it would be justified in financing a man with a pumping plant, the payment for which would be spread over a number of years, so that he might improve his land and increase his production. In the South-East there were limitless possibilities of production, and the Government hoped by the system of drainage to devote a considerable area to closer settlement, and hoped that there would be an increased population growing up under prosperous conditions. The district had done remarkably well, and was capable of much greater development, beyond their loftiest dreams, because people did not realise the wealth they had locked up in the volcanic and drainage areas in the South-East.

Imported Dairy Cows.

The Government recognised that something would have to be done to encourage the dairying industry. During the last few months 500 dairy cows had been imported from the eastern States. They were requiring cows for the soldiers' settlements. The Government was financing the soldiers, and cattle were supplied to them on easy terms of redemption. It was considered better to get the cows from the eastern States than in South Australia; as they purchased at a better price than locally, it was saving money and adding to the dairy cattle in South Australia. He had to apologise for the absence of Mr. Suter, who had gone to the Sydney stock sales. It was a suitable opportunity for securing stud stock of good milking strains. He would purchase young animals, and among other things a stud bull for the people of Mount Gambier. The Branch would recognise that the Government was losing no time in securing what they desired, and he hoped that what the Mount Gambier Branch was doing would be taken up by the other Branches throughout the State.

Profit in Pigs.

Hand in hand with dairying there was usually the pig-raising industry. Every farmer should know that there was profit in pigs, if properly handled. While they had a difficulty in getting rid of their wheat, and there was so much damaged wheat in the country, the farmers should go in more for the grain feeding of pigs. In the past there had always been the danger of over-supplying the market, and then everyone wanted to get out, and prices were ruinous; but in order to avoid that, the Government was prepared to give a fixed price for pork at the Produce Depot. The object was to encourage the development of the industry and establish it on a firm basis, so

that the farmers could go ahead with the production of pork, assured of a definite return. The Minister of Industry was preparing a circular setting out the terms on which the Government was prepared to take in pork. The price offered would leave a good margin of profit, and there need be no fear among those going in for pig raising that production would be overdone, and that there would be a glut in the market. They hoped to make arrangements which would be of benefit to the people in England, to whom the pork would be exported, as well as to the people of South Australia. He desired, on behalf of the Government, to say that it was prepared to do all it possibly could in every direction to encourage rural settlement and increased production.

Lime Crushing Plants.

In connection with the South-East, in much of their land, particularly around Kalangadoo and Bordertown, and country of that class, liming of the soil would have to be carried out much more in the future than it had been in the past. He did not know where it had been carried out extensively in the South-East, except on experimental plots. The Government was considering the question of supplying crushers for the purpose of crushing lime and encouraging its utilisation. In New Zealand they carried lime free on the railways, and it was a profitable arrangement, because of the increased traffic and the improvement of the land. Much South-Eastern land had a tendency to run together and set tight, but he hoped that there would be an improvement in the future. He was glad to notice that the trend of affairs in connection with the war had been more favorable during the past few weeks, and they could look forward with some degree of confidence to the close of the war before they met again; but whether it ended or not, he was sure that the people of that country were prepared to stand behind the Allies and see the thing through to the bitter end. They should not be satisfied with any peace, except a peace on honorable lines and a lasting peace. If it was peace without the power of Prussian militarism being crushed, it would only mean another war in a few years. They desired to make it impossible for German aggression to ever menace the peace of the world again. It was the duty of each and all of them in South Australia and the Commonwealth to show that they were behind the Mother Country, and they would have an opportunity of doing that during the next few years. He hoped that those who had influence would use that influence on the side of the Mother Country. South Australia's interests were wrapped up in the Mother Country, and he was satisfied that the people of that district would rally round the Mother Country in her hour of peril.

LIVESTOCK IN THE SOUTH-EAST.

Professor A. J. Perkins, Director of Agriculture, said that he was unfortunate in not having had time to prepare an address on any subject which might particularly interest them. One of the new duties which had been cast upon him had reference to the purchase of the Mount Remarkable Estate, where they were settling returned soldiers, and that took up time. He had endeavored to have a few of the ques-

tions which were to be brought before the Free Parliament submitted to the secretary before leaving for the Conference, but, unfortunately, the questions sent along were limited in number, and did not afford much scope for developing an address. He was anxious to discuss questions which would be of local interest, and he would be glad to deal with matters which would help them in the difficulties with which they were struggling. The practice of submitting questions beforehand had been tried in other districts, and had proved very satisfactory, because it had afforded time to work them up into an address and deal with them more efficiently than when sprung upon one in a public meeting.

If there was one part of the State which should be settled and peopled to the utmost it should be the South-East, because rainfall represented such an essential feature in the production of crops. Settlement had taken place in the far west, but not to the same extent as in the South-Eastern districts, where it was necessary to employ a large amount of capital—he did not mean unprofitably—but it involved the outlay of more money than the average settler possessed, much more than a settler in the mallee country usually had at his disposal. A man might start in the mallee country with very little, and, given a few good seasons, he would be on his feet almost immediately. If, however, they took up land where the rainfall was abundant, as it was in a good many parts of the South-East, they would find, in country of that sort, the farming was a very different proposition, calling for initial capital, which was difficult to obtain. He trusted that the Minister, when he had occasion to discuss the agricultural policy of the Government, would take into consideration the operations of those who had to start in a country which required a comparatively large amount of capital. It seemed to him that, if money could be advanced on easy terms for special purposes, there was no greater call or more reasonable call than in those districts where farming absorbed more than the average man could lay his hands upon. He wished to refer specially to farming practices in a district such as that. In the course of the last 15 years he had numerous instances of the difficulties of the average farmer endeavoring to combine with farming operations the handling of livestock. If it could be said that livestock was profitable on farms in the Northern Areas, he was positive that, so far as the South-Eastern districts were concerned, it was not merely a question of combining livestock with the growing of crops, but that all of the farmers in those districts should build up their farming around livestock operations. In a sense, on every farm, as far as he could see the position in that district, livestock ought to be the pivot around which everything else should work. He did not mean that they should not raise crops like wheat, oats, barley, or rye, according to the characteristics of the district, but instead of those crops taking the leading part in their farming, they ought to occupy a secondary position. Additionally, these crops would always benefit in growth and yields from the presence of a large number of livestock on the farm. Sometimes there was a tendency to imagine that what one had in view was a series of small stations, with huge paddocks, and perhaps a few boundary riders here and there; but anyone who took the trouble

to think would know that that was quite an erroneous idea. He was satisfied that, given that the South-East was developed on the basis of livestock farming, it would carry a denser population than the Northern Areas on a basis of wheat growing. He did not wish to enter into details as to any particular kind of livestock in the district, because if they took the whole of the district from one end to the other, all kinds would do, though in some districts some forms of livestock would be more at home than others. Of all forms of livestock, however, the one likely to do most good was dairy cattle.

Dairying and Pigraising.

It was a surprise to him that, even in the more settled portions of the South-East, dairying was not more practised. It was often said that South Australian farmers did not like dairying, that, among other things, they objected to the milking. There might be something in that, but he had always felt that, if it were possible for the farmers to be less suspicious of one another, and endeavor to co-operate, they might make dairying a more interesting and more profitable undertaking. Along with dairy cattle there was the pig industry, and he noticed with pleasure that the Government proposed fixing a definite price for pork, with a view to the export of bacon and ham. He would like to point out the enormous quantity of cured pork, bacon, and ham imported annually by Great Britain, and it seemed an anomaly that Australia did not participate in that trade. British annual imports of that character for five years before the war totalled £19,000,000. The countries that did most of that business were not countries which had cheap labor, the chief exporter being the United States. Without wishing to rob the United States, whose share of the trade during the period mentioned was £8,000,000, Australia should contribute to the supply. Canada exported something like £1,500,000, and so on. If they could develop the pig industry, knowing that there was an assured market, and that there was a profit to be made in pigs, then a successful time was ahead of the industry.

Sheep.

In regard to sheep, he did not know the South-East sufficiently well, perhaps, to say definitely that those districts would be able to compete in the production of early fat lambs for export purposes. He did not think that that was likely to be the case. He referred to the results at Kybybolite, which, in that particular direction, had not shown to advantage. They found that the lambs did not come off their mothers fit for export purposes—they needed topping up, in the same way that they were topped up in New Zealand and different parts of England. That was a matter of feed; but if they could not get early fat lambs, as in the Northern Areas, there were other purposes to which the sheep could be put. If they conducted livestock farming on the lines he had indicated, their farming operations would have to be different from those in the north. He did not think that they would give a preponderating position to cereal crops, because they would need forage crops, which would be sown chiefly with the object of feeding livestock. About two years ago he had occasion to speak of forage crops at Mount Gambier, and it was unnecessary to go over that again; but forage crops would

require to be grown more extensively than at the present time. Some forage crops suited that district, such as kale, which had been successfully grown at Kybybolite, and he had grown it at Roseworthy under favorable conditions—that was in a season like the present, with early autumn rains. Then there were mangolds, millet, and sorghum. In the present season they had grown a crop of Soudan grass, which had made good growth, and was likely to prove a good forage crop for the district. Peas also provided a forage crop, which could be utilised to a far greater extent than it was at the present time. Lucerne also would do, wherever the conditions were favorable, and there were others which might be tested. He was sure, in the conditions existing, with their rainfall and soil, they could grow forage crops which would be profitable food for livestock. There was another form of husbandry on farms of that description which could be availed of, and that was the laying down of temporary pastures. The land could be sown with a mixture of grasses for a period of time, say, three, five, or six years, which was infinitely preferable to depending solely on rubbish and the growth which sprang up spontaneously. It was to be hoped that when they took to handling livestock on small estates, they would make provision a year ahead for their wants. There were various ways of doing that. They could provide ensilage. The Minister was in sympathy with the scheme, and Mr. Suter had advocated it. Assistance should be given dairy farmers to put up ensilage silos, in which could be stored material that could be used when feedstuffs were unobtainable. Grain could also be fed to livestock in various districts, and he did not know that it was not one of the cheapest forms of food, when combined with a certain amount of grazing. Handling the land as he had indicated necessitated a good deal of hand feeding, because grazing would not see them through. If they depended on grazing alone, they could have only a small number of livestock, and they could not make them the centre of their operations. For any type of livestock grazing should be incidental, and handfeeding should be the rule. That added to the initial expense of the farm. There was not only the question of securing the livestock, but also of subdividing the farm into small paddocks. Water had to be placed in every field, and conveniences such as troughs had to be provided, all of which meant a very big initial outlay. The South-East could not develop thoroughly until the people were ready to take it up on the lines he had indicated. It had been stated that the South-East, whilst excellent country for fattening, had proved itself unsatisfactory in the development of young stock. He thought that there was some foundation for that, possibly not from the point of view of climate, but of soil, from deficiency in lime and phosphates.

Irrigation.

There was the question of irrigation to which he would also like to refer. Irrigation had, in the great majority of cases, succeeded only in the form of closely knit colonies having common interests. That was because the cost of handling water was reduced to a minimum, and they worked as communities and not as individuals. There were places where individuals might succeed in the South-East, but he would like to have an opportunity of testing the matter depart-

mentally. There was, in some places, excellent underground water within very easy reach of the surface. If that water could be handled by the comparatively cheap pumps which existed nowadays, they could have a number of crops on small areas; but though it would mean more labor, they must come to recognise, not that they must do with as little labor as possible, but with as much as was economically possible. If they tackled irrigation problems they must use hand labor. The first crop which came to their minds in regard to irrigation was always lucerne. If lucerne were put in, there would be very little to do afterwards. It was excellent, and where there were dairy herds it could not be bettered. There was also maize growing for grain and for forage crops. Maize depended on summer rains. But in the South-East, if water were available within reasonable distance, they could grow a summer crop which would be more profitable than a winter crop. Maize gave profitable yields up to 50bush. and 60bush. and even 100bush. per acre. They would get more from an acre irrigated than from 10 acres of winter crop.

FREE PARLIAMENT.

Destruction of Foxes.

Mr. J. M. Wray (Naracoorte) referred to the damage done by foxes. The loss sustained in lambing was very serious. He suggested that the farmers should co-operate and lay poison for the foxes during the months of March and April, before the lambing commenced. In that way the foxes would be got rid of before they could do much damage.

Professor Perkins said that there had been trouble with foxes at Roseworthy; but the only successful method of combating them was by laying poison a couple of months before lambing commenced. They had either to do that or consider the question of bringing the lambs in at night.

Hon. C. Goode suggested that they should call a meeting of the residents if damage were being done, and then determine on some united action within the district, with a view of killing the foxes.

Mr. A. Bradley (Kybybolite) suggested that each Branch should decide what should be done in each district, and that course was agreed upon.

IMPRESSIONS GAINED FROM WORKING FRINGE COUNTRY OF SOUTH-EAST.

Mr. S. Ockley of the Penola Branch, contributed the following paper:—

The grey sandy loams, timbered mostly with the different eucalypts, varying between red gum and stringy bark and interspersed with patches of yacca and bracken, known as "fringe country," cover a considerable area of the South-East, and although it is generally considered that their best usage is wool growing, still economic conditions have altered so much of late years, that the plough can now be profitably used. These lands have incurred a condemnation which they do not deserve from many who have attempted grain and hay growing on them. They have the reputation of becoming useless for cultivation after a year or two, through being overrun with sorrel, and of being

unable to fatten; which is true enough to those whose extent of farming experience is growing a hay or grain crop and keeping as many sheep as the uncultivated land will carry. However, such management only accentuates the most conspicuous disadvantages of light land, viz., stagnation during winter, due to super-saturation and the poor feeding value of the natural grass. The great advantages of the sandy loams are the retention of moisture during the summer, the early and sure germination during early autumn, and the ease of working, except when the ground is too sloppy. To use these advantages, it is easily seen that the production must consist of the growth of fodder crops, and the avenue for turning them into £. s. d. is their utilisation by sheep, although dairy cows will turn the produce into profit. Still, one has to work too much country for convenience in daily attendance to dairy work, whereas roomy conditions are the best for sheep.

Fodder Crops.

This theme of fodder growing is on every farmer's lips at present, especially in relation to sheep farming, and the economic advantages of combining sheep and tillage are fully recognised both by hitherto wheat farmers and graziers. It must be admitted, however, that the fodder crops that are grown are rather spasmodic productions, occupying a very small percentage of the farms, and not forming a definite place in the crop rotation. But for the successful occupation of the fringe lands (it must be explained that my references deal with a 26in. rainfall, although this may apply to lands of less annual fall) forage crops must be the primary production, grain only secondary; and in order to carry more stock than the pasture and stubbles would ordinarily support, it is necessary to have some pre-arranged system, lest one find himself with double or treble the stock than the land is ordinarily capable of carrying, without having made provision for such a contingency months beforehand. For a man who could command sufficient capital to equip himself with six horses, a 4-furrow plough, drill (13 disk), binder, disk cultivator, and harvester, and 600 breeding ewes, a suitably-sized farm would consist of 1,000 acres of land, valued at £2 per acre, or perhaps a little less, out of which, say, 600 acres would be suitable to cultivate, the remainder consisting of a few swamps and patches of bracken land too poor to plough, as is nearly always the case in fringe country.

The boundaries must be netted; big expense in clearing avoided; all litter on the ground, and trees smaller than 14in. in diameter burnt. Useless green timber should be rung. The essential is to get the land turned up as quickly as possible, as the natural grass is not of much value.

The area should be subdivided into three sheep-proof paddocks, each containing as nearly as possible 200 acres of land, fit to cultivate and break up. One paddock should be seeded with half oats, half wheat, which requires to be finished by the end of May. A normal winter generally puts an end to tillage operations on light land by June. As soon as the ground allows it after winter, plough paddock No. 2. Work it down in early October, and drill in Eclipse maize at the rate of 10lbs. per acre, which is about the amount sown if the maize is put through

the oat chutes, with the regulator standing at 1bush. per acre, and three chutes out of every four blocked. Thus, with a 13-chute drill, the seed will come out of the 1st, 5th, 9th, and 13th chutes, consequently on the return trip of the drill it will be necessray to allow a couple of feet to keep the rows a sufficient distance apart, which, of course, means that a much larger area can be covered per day than is the case in drilling wheat or oats. In October daylight 20 acres per day can be averaged. It is most important that the seed should not be sown thickly, as thick sowing overtaxes the available moisture in the soil during summer, just as two sheep to the acre overtax land suitable only to carry one per acre. Also a thick growth, even were it a success, would help to spoil the benefits of the ploughed land as a fallow. The object is to grow some fodder on the fallow to maintain the stock during autumn, since the maize is available for stock by mid-February, and to regulate the feed, if necessary it would suffice only to allow access to the crop by the sheep during a portion of each day, since the object is not to fatten but just to maintain the breeding ewes. It is important that maize should have reached the cobbing stage before being fed.

As soon as possible after the crop in paddock No. 1 is harvested and grain carted, the 100 acres of wheat stubbles should be disked, and oats drilled in at rate of 1bush. or 1½bush. of seed and about 40lbs. of super. per acre to catch the first rains in March, so that a large amount of feed will be available for the ewes as they lamb. Here lies one inestimable advantage in light land, you may get a good germination with a comparatively light fall of rain in February or March, and need have little or no fear of the young stuff withering off. Oats grow rapidly when drilled on shallow-worked ground; also whenever it is intended that stock should feed on cultivated ground during winter, the deeper the working the more will the stock puddle and spoil the ground.

The first week in May (by which time the ewes willl be finishing the maize butts) should see the drill at work on the maize fallows, drilling in the oats and wheat. A chain will cover the seed. If April has been wet enough to consolidate the ground the cultivator will be required ahead of the drill.

The next work for the teams is to plough paddock No. 3, in August and September, to be sown with maize in October, which crop will be followed by grain, then by 20 months stubble grazing to complete the three years, when the rotation commences again.

The following table will better explain the utilisation of the paddocks:—

	First Year.	
No. 1. Grain—May-Dec.	No. 2. Grass—Jan. to Aug. Maize fallow—Aug.-Dec.	No. 3. Grazing.
	Second Year.	
Grain and stubbles—Jan. and Feb. Green feed—Mar.-Dec.	Maize—Jan.-May. Grain—June-Dec.	Grazing till Aug.-Dec.
	Third Year.	
Grazing—Jan.-Aug. Maize fallow—Aug.-Dec.	Grain and stubbles—Jan. and Feb. Green feed—March-Dec.	Maize—Jan.-May. Grain—June-Dec.

It will be seen that over a course of three years each paddock produces a crop of maize, one of grain, and one of green feed, as well as 10 to 12 months of grazing, and to explain the benefits of the rotation it will be advisable to compare the following table regarding the disposal of the stock designated as ewes, bought when the stubbles become available, *i.e.*, February of second year.

Second Year.

No. 1.	No. 2.	No. 3.
Ewes, stubbles, Feb. Ewes and lambs on stubbles and green oats, Aug. to Dec.	Ewes, maize, Mar., Apr., May	Ewes on grass, mid-May to mid-July; as they lamb draft them off into green feed in paddock No. 1.

A glance at the table will show that all the stubbles in paddock No. 1 are available for the ewes during February and also March if required, although the time they are in there will be determined by the result of the maize crop, and also the earliness of the first rains, when of course the wheat stubbles have to be disked and oats sown. In March the ewes go on to the maize in paddock No. 2, where they remain. (The rams should be joined to the ewes from February 15th to April 15th, or thereabouts.) In May, as the maize fallows are being drilled, the sheep will need to be shifted as the seed germinates in paddock No. 3, which has had no stock whatever since the beginning of the year, and consequently is fresh and in good heart. This paddock is to hold the ewes till they commence to lamb in mid-July. As they lamb draft them off into paddock No. 1, which contains the self-sown oat crop and 100 acres disked in. My records show that the latest date on which my green feed was ready for stock (*i.e.*, about 18in. high) was in 1915, when the autumn was late, and it was July 19th before stock were turned in. In 1914, however, peas and oats were 18in. high by May 31st. It would be as well to give my records of summer rainfall. Since 1910 the average has been—November, 186; December, 176; January, 65; February, 120; March, 105; April, 181.

It is not advisable to lamb the ewes in the green feed, because it only tends to cause the udder to become too full of milk before lambing and the ewe is almost afraid to let the lamb suck. The long wet feed also prevents the newly-born lamb getting up, and moreover it is difficult to see the ewes. A grass paddock with clumps of short bracken is ideal for lambing ewes, as the bracken affords good shelter. By the end of August the most of the ewes with their lambs, will be in paddock No. 1. By October spring will make its presence felt, after which time there is no dearth of feed, and in January the lambs are sold, while the ewes continue a similar routine. The question of sale rests with market conditions. It does not always pay to top up, but usually it does: and in regard to the disposal of oats, topping up sheep or lambs is a profitable avenue. We all know that experienced buyers buy according to estimated carcass weight and quality, and the prime quality realises from ½d. to 1d. a lb. more than good quality. I do not know how many pounds of oats would make a gain of 1lb. of mutton. A healthy pig is credited with increasing 1lb. for every 4lbs. of grain judiciously fed. Allow 10lbs. of oats to make 1lb. of mutton. If one

had a lamb of good quality, which would kill 32lbs. at say 6d. per lb., and an additional bushel of oats would increase that weight to 36lbs., at the same time making it prime, and worth 6½d. per lb., the oats would practically return:—

	s.	d.
4lbs. at 6½d.	2	2
Increase of ½d. on the 32lbs.	1	4
Saving of bag and cartage	0	6
Total	4	0

It is enlightening to see how such a system spreads the work evenly throughout the year, which approximately would be divided among the following occupations:—

January and February	Harvesting.
March	Disk in 100 acres oats.
April	General work; commence preparation of maize fallow for grain, if necessary; crutch ewes heavily.
May	Drilling grain crop.
June	Finish drilling; general work.
July	Attend lambing ewes.
August	Attend lambing ewes; commence fallowing for maize.
September	Fallowing.
October	Drill maize.
November and December	General work, shear, &c.

With six horses and six-horse implements a man would never require more than a youth to help him on a farm of 600 acres arable fringe country. This system, if applied from the commencement will prevent sorrel getting a hold on the ground, and it will increase the growths of clovers and Cape weed, both good milk makers. The horses are never worked hard, only one ploughing for the three crops, consequently they will do on hay, provided good mangers are made to prevent loss of grain. A horse just leaves enough straw to bed himself down lightly, when hay fed, and my estimate is that 10 tons of hay goes as far as nine tons of chaff.

A Comparison.

We will compare two other methods of working similar ground with the principle advocated, which would require, roughly speaking:—

	£	s.	d.
Seed and super. for 200 acres at 7s. 6d. per acre	75	0	0
Seed and super. for 200 acres maize at 2s. 6d. per acre	25	0	0
Seed and super. for 100 acres oats green feed, at 4s. per acre	20	0	0
Wages and upkeep of youth	100	0	0
Incidental expenses	80	0	0
Interest on holding and plant, £2,600 at 5 per cent.	130	0	0
Interest on sheep, at 10 per cent.	70	0	0
Total	£500	0	0

The returns would consist of—

	£	s.	d.
Produce of 600 ewes	600	0	0
Produce of 200 acres grain	350	0	0
Total	£950	0	0
Leaving a balance of	£450	0	0

An alternate method of working 300 acres grain, 300 acres fallow would entail the same or greater plant, and require the same assistance. There would be more expense of upkeep of plant, as harvesting is the occupation that is expensive on machinery, oil, &c. The expenses on an extra 100 acres of wheat would offset the expenses on the maize and green feed, so the only difference in expenses would be the £70 interest on sheep, which leaves his expenses as £430. Returns could be estimated at 300 acres crop, £525; and say dealing with stock on three months stubbles, £75, equals £600; balance of £170. There would be a rush at harvest time, with danger of rain if late, and the system of bare fallow would tend to impoverish the light land.

The other method of 300 acres crop and 300 grass is worse still, as such would result in plenty of sorrel in a few years; also by the time 300 acres were harvested and the 300 acres ploughed and seeded, the farmer would be floundering in the winter with disastrous results. The ewes that would be kept on the 300 acres grass would be in the one paddock. All the year the grass would never get headway; perhaps 200 might be carried. This is the most unprofitable rotation, yet it is the commonest. The rush of work entails extra expense and danger of loss, which easily outweighs the £70 interest on sheep, and being so generous as to allow that the grain results would be equal to those of the two formerly mentioned rotations, the balance would approximately be 300 acres grain, £525; 200 ewes, £200; equals £725; less expenses, £500; balance, £225.

These approximate figures, of course, depend on the average estimate of results from grain growing and grazing on cultivated crops and grass. That has been my experience, and the estimate that £1 per ewe for wool and lamb could be obtained from aged Merino ewes mated to long-wool rams, and allowing 80 per cent. lambs, at present prices is conservative. Too much importance cannot be laid on the principle of keeping all stock off young grass on light country. If checked at the start headway is prevented. Similarly, on light land, crops will never stand feeding off.

This can only be obtained by having a crop like maize to maintain the sheep without the labor of hand feeding during the autumn. Accepting these figures as reliable, it shows at what great disadvantage is the settler who is not in a position to buy sheep as well as working plant. In fact he could not continue, because under either of the two last-named methods the grain-producing abilities of the land would lessen, although the grazing capacity might increase. The principle advocated would keep the land in good heart, although the farmer requires a knowledge of stock as well as grain growing. To be successful he should have ability to judge the condition of his stock, to say whether they are thriving or not without having to wait until they become poor and weak before he knows it.

Two Essentials for Successful Occupation of Fringe Land.

This fringe country cannot be worked with success with wheat as the primary product. The ordinary settler who generally has only sufficient capital to buy working plant, and looks to his produce to maintain him entirely is compelled to apply the system of 300 acres grain,

300 out for fallow, which system results in diminishing results every year, because the problem of purchasing the breeding flock is the killer. The land may be obtained under closer settlement conditions, implements on time payment, but stock requires practically cash, and although stock agents materially assist many men to establish flocks, still their conditions are rather exacting, and the farmer often cannot keep his sheep for a sufficient length of time to obtain the results he should. Although it sounds like asking a lot, if the Government could propound some scheme to assist farmers in this respect, it would advance agriculture, in the South-East especially. Although the procedure may be more difficult, still, with much hesitation and being fully alive to my being comparatively inexperienced in matters pertaining to stock agency business, the following method has presented itself to me as perhaps worth exciting the criticism of the brains of stock agency:—At present an agent supplies sheep to a client on a three months' bill, and in the event of failure of the client the agent bears the responsibility, as he finds the money, consequently the agent uses discretion in such transactions.

Now, say the Government could arrange with a firm or firms that farmers could obtain ewes through them, just as they now receive wire netting through the districts councils, *i.e.*, the Government would find the money, the farmer would inspect the ewes with the agent, if price satisfactory, purchase, in which case the agent would get the usual commission, and be responsible, similarly as the district councils are held responsible, *i.e.*, the farmer would be responsible to the agency firm, and the firm responsible to the Government for the amount of the ewes, instalments at shearing and lambing. Many limitations would undoubtedly be necessary, but it is not an impossible procedure.

Another advantage to settlement of fringe land is facility in obtaining land under closer settlement conditions. At present, only when an estate is purchased by Government and subdivided can one obtain a closer settlement block; but these fringe lands do not appeal to the Government as suitable to buy in bulk, as an estate may be too much interspersed with rough country. What is required is ability for a settler to obtain a block under closer settlement condition without it being necessary to wait until an estate is offered. If an area of virgin land, say the size of one farm, is available and can be obtained at satisfactory price, it would encourage settlement if one could obtain such land on closer settlement conditions, subject to the approval of the Land Board. It may be years before a man can get land under closer settlement conditions if he has to wait until an estate is purchased by the Governmenet in the locality with which he is acquainted, whereas there may be numerous separate areas available, except that he is unable to get terms equal to those which the Land Board give.

Next Conference.

Mr. J. M. Wray (Naracoorte) moved that the next Conference be held at Naracoorte.

Mr. T. J. Tidy (Naracoorte) seconded the motion, which was carried unanimously.

VOTES OF THANKS.

On the motion of Mr. S. Shepherd (Kybybolite), seconded by Mr. T Stanton (Tatiara), a hearty vote of thanks was accorded to the Minister of Agriculture and the officers of the Agricultural Department. The Hon. C. Goode, M.P., responded, and proposed a vote of thanks to the chairman, which was carried by acclamation, and the proceedings terminated.

DAIRY AND FARM PRODUCE MARKETS.

A. W. Sandford & Co., Limited, report on 1st May:—

BUTTER.—A slight increase in production is to be recorded for the month of April, and there is still a surplus in South Australia of second and third quality butters. However, the London market continues to offer a satisfactory price, and thus values have well maintained. A proportion of our firsts are being received from the eastern States, and prices at the end of April were:—"Alfa," 1s. 6½d.; "Primus," 1s. 6d.; third grade creamery, 1s. 2½d. to 1s. 3½d.; choice separators and dairies, 1s. 4d. to 1s. 5d.; fair quality, 1s. 2d. to 1s. 3d.; store and collectors' lines, 1s. to 1s. 2d. per lb.

EGGS.—A seasonable shrinkage can be reported for the month, and in consequence of this a firming in rates occurred at the last sale, hen selling at 1s. 5d.; duck, 1s. 6d. per dozen.

CHEESE.—Production still maintains, but with good inquiry, both locally and for export, there is no alteration in prices, viz. 8d. to 9d. per lb. for large to loaf.

HONEY.—Substantially heavier quantities have come forward, but market is firm, prime clear extracted selling at 4d. to 4½d. per lb.; second grades, 3d. to 3½d.; beeswax, saleable at 1s. 7d. to 1s. 8d. per lb.

ALMONDS are still short of trade requirements, and the advance reported a month ago continues to hold. Brandis, 11d.; mixed softshells, 10½d.; hardshells, 6d.; kernels, 1s. 8d. to 1s. 9d. per lb.

BACON.—Pigs are very much more plentiful than has been the case for a long time past, the farmers realising that with the cheapness of feed this animal is a profitable adjunct to the farm. The last few pig markets have recorded very substantial increases in supplies. In consequence of this bacon is just a shade easier, so that best factory cured sides are now selling at 11d. to 11½d. per lb.; middles, 1s. 1d.; hams, 1s. 1d. to 1s. 2d.; rolls, 10½d. to 11d. per lb.

LIVE POULTRY.—Farmers are wisely sending in their surplus poultry in view of the good prices now ruling, the catalogues being large, and good prices obtained, especially for birds fit to kill; light sorts selling according to condition. Heavyweight table roosters, 3s. to 4s. each; nice conditioned cockerels and plump hens, 2s. to 3s.; light birds, 1s. 3d. to 1s. 9d.; ducks, 2s. to 3s. 4d.; geese, 4s. to 4s. 6d.; pigeons, 4d. each; turkeys, from 6½d. to 9½d. per lb. live weight for fair to good table birds.

POTATOES have offered very freely, and buyers have had no difficulty in obtaining their requirements from the Adelaide Hills, Mount Gambier, or Victoria. Therefore the closing days of the month found prices slightly lower all round. ONIONS.—Deliveries of locally-grown onions have fallen off considerably, but with plenty offering from the South-East and Victoria; values have not undergone any alteration. Prices—Potatoes, £4 to £4 10s. per ton on rails Mile End or Port Adelaide. Onions, £5 10s. to £6 per ton on rails Mile end or Port Adelaide.

ADVISORY BOARD OF AGRICULTURE.

The monthly meeting of the Advisory Board of Agriculture was held on Wednesday, April 18th, there being present Messrs F. Coleman (chair), T. H. Williams, A. M. Dawkins, J. Miller, C. J. Tuckwell, Professor Perkins, and the Acting Secretary (Mr. H. J. Finnis).

Women's Branches of the Bureau.

The Hon. the Minister of Agriculture intimated the Government's approval to the Board's recommendation in respect to the formation of Women's Branches of the Agricultural Bureau.

Incorrectly Named Nursery Stock.

The Blackheath Branch requested that steps should be taken to secure the introduction of legislation designed to prevent the supply of incorrectly named stock by nurserymen. It was decided to secure a report on the matter from the Horticultural Instructor (Mr. Quinn).

Wharfage Rates.

The Harbors Board wrote that they could not recommend an alteration in wharfage rates on parcels at outports, as desired by the Upper Eyre's Peninsula Branches of the Bureau. The regulation dealing with wharfage on milk and cream in operation on the River Murray applied to all ports, it was stated. Mr. Dawkins emphasized the necessity for alteration in the rates, because they were crippling production. Even if the Government made a loss on them it would recover the amount in increased development. It was decided to refer the matter back to the Minister, reiterating the Board's recommendation that a reduction should be made.

Wheat Receipts.

The Wheat Harvest Board, in response to a request for an expression of opinion on the proposal that agents should supply farmers with receipts showing the individual weights of bags of wheat delivered, reported as follows:—"The wheat merchants who are acting as agents for the Board cannot see their way to issue receipts showing the weight of each bag of wheat delivered by the respective farmers. The rush of work at the time of delivery renders such impracticable. At the same time it is believed that any wheat agents will gladly permit farmers to scrutinize their tally-books and check the additions that are made in securing the total entered upon each receipt."

Experimental Farm on the Murray.

It was resolved to forward to the Minister of Agriculture a proposal from the Berri Branch to establish an experimental farm in that district. The Branch pointed out that there were other industries

in addition to fruitgrowing that should find a place upon the irrigated lands, and that the Government should assist settlers by testing the possibilities of fodders, new plants, cereals, and possibly new fruits. It was decided to inform the Branch that the Board had already recommended the Government to take steps in the direction of establishing a farm for the purpose of conducting the tests referred to.

Stock Trucking Yards at Melrose.

The Board decided to urge the Minister of Agriculture to secure stock trucking yards at Melrose.

New Members.

The Branch at Stirling's Well was closed, and the following names were added to the rolls of existing Branches:—Northfield—E. L. Canole; Salt Creek—P. Gale; Yallunda—F. E. B. Daniel, E. E. Blake, E. V. Fitzgerald; Inman Valley—John Stone; Ki-Ki—M. J. Young, C. R. Cooley, W. Bone, A. Morris, H. Porter, sen., H. Porter, jun., S. H. Hailes; Naracoorte—C. F. W. Staude, T. Munn; Cummins—Albert Fuss, O. A. Hall, R. H. Siviour, B. C. Black, Wm. B. Walkom; Wirrabara—S. Coad, E. E. Bairstowe; Lone Pine—H. Hoffmann; Northfield—James Neely; Brentwood—J. V. Davey, C. H. Launer; Pompoota—E. C. Hansford, L. A. King, H. Labiam, J. Carroll, J. J. Carson, C. E. Hill, A. E. Betts, G. Jolly, A. A. Verran, A. Woodhouse; Narridy—W. F. Nicholls; Murray Bridge—Robertson, — Reynolds, H. Filsell, C. G. Gudge, J. Rowan, A. Wells, J. T. Green; Berri—Chas. Garner.

THE AGRICULTURAL OUTLOOK.

REPORT FOR MONTH OF APRIL.

The following reports on the general agricultural condition and outlook of the areas represented by the Government Experimental farms mentioned below have been prepared by the respective managers:—

Booborowie.—Weather—With the exception of a few light showers during the early part of the month, the weather has been dry. The latter part of the month was unseasonable, and a good rain was needed that farmers might cultivate their land. Crops—Sowing has not been started, the ground being in poor condition for seeding. Natural Feed—The early grass has suffered a check due to the dryness of the month. Stock—Many deaths have occurred amongst horse stock, due to colic, caused by eating paddy melons. Pests—Mice are doing great damage in stacks of wheat and hay, and also by eating the plants in the gardens. Miscellaneous—As a result of the wet winter of last year and the cool summer the springs in the creeks have been very strong.

Eyre's Peninsula.—Weather has been cool with scattered very light showers, 40 points rain being registered for the month, rather less than the average for the past three years, viz., 62 points. Crops—Preparations for seeding have been general. The comparatively calm weather has greatly hindered burning operations. A small area has been sown in the district, but the majority are awaiting a good fall of rain. Natural Feed—Self-sown and natural feed are plentiful, and consequently have checked the burning of stubbles. Pests—Mice are plentiful, and playing havoc with the haystacks and seed wheat of the district. Rabbits are fairly plentiful.

Kybybolite.—Weather—Extremely cold in the early part of the month, but mild after, only light showers of rain have fallen. Crops—Seeding is more or less retarded by the dry weather; oats have been sown in many instances, but no wheat. Fodder crops are giving good late growth. Blight has developed on the kale plants, destroying a considerable amount of growth; it has never been known to kill kale, the crop always making a quick recovery after the rains. Natural Feed—The new growth has made very little advance on last month; there is an abundance everywhere. Stock are in very good order; the weather is favorable to the early lambs. Pests—Foxes are much more numerous than usual, and serious trouble is expected during the lambing season.

Turretfield.—Weather conditions during April were generally fine with some cold nights. The rainfall was 74 points, of which the greater part fell in the early part of the month. Further falls are now being eagerly looked forward to. Crops.—Farmers have not started seeding to any great extent. They are waiting for rain for two reasons. Firstly to secure immediate germination, and secondly in the hope that a good rain will kill a large number of the mice which infest the fields. Natural feed is going off considerably, the grass having a decided yellow tint. Stock have improved in condition since last month. Some sheep have been lost in the district. The Government Veterinary Surgeon (Mr. F. E. Place) conducted a post-mortem examination in several cases and found the cause of death to be sarcosporidious (blood cell parasites). Pests—Starlings have not been so much in evidence during the month of March, presumably owing to the closing of the fruit season. But all other pests pale into insignificance when compared with the mice plague. These rodents are doing very considerable damage in the barns and elsewhere.

Veitch.—Weather—Rainfall for month, 24 points; Veitch average for same month, 28 points. Weather conditions have been suitable for cultivation. Natural Feed—Both stubble and scrub feed are showing up well. Stock—All in healthy condition. Pests—Mice are doing a lot of damage. Miscellaneous—Seeding operations are now going ahead on a good many farms in the district. Wheat is still being carted into the Veitch siding.

RAINFALL TABLE.

The following figures, from data supplied by the Commonwealth Meteorological Department, show the rainfall at the subjoined stations for the month of and to the end of April, 1917, also the average precipitation to the end of April, and the average annual rainfall.

Station.	For April, 1917.	To end April, 1917.	Av'ge. to end April	Av'ge. Annual Rainfall
Far North and Upper North.				
Oodnadatta	—	3·28	2·16	4·76
Tarcoola	0·13	4·32	1·54	7·58
Hergott	0·03	2·47	1·91	6·04
Farina	—	2·95	2·16	6·70
Leigh's Creek ...	—	4·86	2·49	8·66
Beltana	—	5·48	2·75	9·22
Blinman	—	3·94	3·50	12·83
Hookina	—	8·03	1·67	—
Hawker	—	7·65	2·42	12·22
Wilson.....	—	5·26	2·59	11·78
Gordon	—	7·57	1·97	10·26
Quorn	—	4·97	2·61	13·78
Port Augusta....	—	3·18	2·51	9·46
Port Augusta W..	—	3·50	2·17	9·36
Bruce	0·04	4·80	1·93	10·01
Hammond	0·06	7·39	2·61	11·46
Wilmington	0·13	5·12	3·54	18·26
Willowie	0·09	6·09	2·35	11·90
Melrose	0·34	6·86	4·81	23·04
Booleroo Centre..	0·12	5·97	3·16	15·83
Port Germein ...	0·10	4·15	2·96	12·84
Wirrabara.....	0·16	5·55	3·75	18·91
Appila	0·16	5·36	3·39	15·08
Cradock	—	6·14	2·37	10·86
Carrieton	0·05	7·15	2·51	12·22
Johnburg	0·01	5·69	2·04	10·21
Eurelia	—	6·95	2·72	13·24
Orroroo	0·02	6·49	3·17	13·42
Black Rock	0·03	6·25	2·86	12·25
Petersburg	0·13	7·07	3·04	13·07
Yongala	0·13	6·80	2·89	13·94
North-East.				
Ucolta	—	6·14	0·95	—
Nackara	—	6·95	1·42	—
Yunta	—	6·58	2·19	8·22
Waukaringa	—	5·74	2·01	7·94
Mannahill	—	4·58	2·30	8·46
Cockburn	—	6·12	2·24	7·97
Broken Hill, NSW	—	7·34	2·72	9·63
Lower North.				
Port Pirie	0·08	4·98	3·11	13·21
Port Broughton .	0·20	3·05	3·18	14·33
Bute	0·08	3·66	3·20	15·42
Laura	0·38	5·02	3·69	18·22
Caltowie	0·33	4·61	3·51	17·27
Jamestown	0·19	4·44	3·43	17·46
Gladstone	0·42	4·82	3·33	16·00
Crystal Brook....	0·35	4·42	3·25	15·62
Georgetown	0·28	5·26	3·78	18·32
Narridy	0·22	4·63	3·46	16·79
Redhill	0·09	4·43	3·38	16·79
Spalding	0·18	3·36	3·21	20·25

Station.	For April, 1917.	To end April, 1917.	Av'ge. to end April.	Av'ge. Annual Rainfall
Lower North—*continued.*				
Gulnare	0·42	4·53	2·90	19·74
Bundaleer W. Wks.	0·36	3·59	2·89	17·29
Yacka	0·29	3·91	3·01	15·27
Koolunga	0·13	4·66	3·27	15·94
Snowtown.....	0·23	4·03	3·23	15·70
Brinkworth	0·11	4·34	2·78	15·48
Blyth.....	0·43	4·08	3·50	16·34
Clare	1·05	6·16	4·80	24·30
Mintaro Central...	0·90	6·06	3·90	21·99
Watervale.....	1·75	7·50	5·32	27·17
Auburn	1·15	6·30	4·25	24·25
Hoyleton	0·61	4·58	3·84	17·96
Balaklava	0·41	3·91	3·58	16·03
Port Wakefield ..	0·40	5·02	3·42	13·13
Terowie	—	5·04	3·12	13·71
Yarcowie	—	5·71	3·09	13·91
Hallett	0·10	3·04	3·20	16·40
Mount Bryan ...	0·16	3·14	2·96	15·73
Burra	0·34	2·85	3·63	17·82
Farrell's Flat	0·45	3·03	3·79	18·87
West of Murray Range.				
Manoora	0·83	4·89	3·53	18·09
Saddleworth	0·85	4·40	4·28	19·69
Marrabel	0·72	3·83	3·96	18·94
Riverton	0·86	6·06	4·37	20·48
Tarlee	0·74	4·13	3·94	17·48
Stockport	0·66	3·45	3·64	15·89
Hamley Bridge ..	0·59	3·59	3·78	16·45
Kapunda	0·75	3·67	4·33	19·67
Freeling	0·92	3·55	3·99	17·85
Greenock	0·70	3·97	4·40	21·46
Truro.....	0·57	3·84	4·09	19·74
Stockwell	0·67	3·82	4·16	20·30
Nuriootpa	0·68	3·50	4·26	21·25
Angaston	1·16	4·59	4·41	22·25
Tanunda	0·87	3·79	4·61	22·28
Lyndoch	1·00	4·32	4·39	23·01
Williamstown....	1·02	4·71	5·03	—
Adelaide Plains.				
Mallala	0·53	3·91	3·71	16·88
Roseworthy	0·85	4·10	3·90	17·31
Gawler	1·06	5·07	4·16	19·21
Two Wells	0·40	3·48	3·62	16·36
Virginia.....	0·84	4·87	3·81	17·35
Smithfield	0·90	5·15	3·56	17·30
Salisbury	0·78	5·19	4·11	18·57
North Adelaide ..	0·80	7·31	4·37	21·49
Adelaide	0·68	6·02	4·25	21·04
Brighton	1·04	7·13	4·03	—
Glenelg	0·62	5·80	3·88	—
Magill	1·08	7·14	5·13	19·93
Glen Osmond ...	1·26	7·65	5·01	25·26
Mitcham	0·97	7·00	4·59	23·47
Belair	1·39	7·93	5·59	28·64

RAINFALL—*continued.*

Station.	For April, 1917	To end April, 1917.	Av'ge. to end April.	Av'ge. Annual Rainfall
Mount Lofty Ranges.				
Teatree Gully....	1·83	6·89	5·49	28·19
Stirling West ...	1·99	11·33	8·48	46·70
Uraidla	2·55	11·01	8·08	44·35
Clarendon	1·40	8·38	6·55	33·67
Morphett Vale ..	1·17	6·45	4·79	23·32
Noarlunga	0·71	6·51	3·99	20·28
Willunga	1·78	8·16	4·80	25·98
Aldinga	1·06	7·27	4·02	20·34
Normanville	0·54	5·74	3·95	20·65
Yankalilla.....	0·77	6·41	4·53	22·78
Cape Jervis	0·60	4·50	2·95	16·34
Mount Pleasant .	0·91	4·68	4·98	26·87
Blumberg	1·20	5·99	5·39	29·38
Gumeracha	1·57	7·71	5·18	33·30
Lobethal	1·98	7·43	5·97	35·38
Woodside	0·97	6·96	5·44	31·87
Hahndorf	1·22	6·41	6·07	35·45
Nairne	1·13	6·42	5·62	28·83
Mount Barker ...	1·70	8·40	5·65	30·93
Echunga	1·62	8·26	6·18	32·83
Macclesfield	1·90	7·64	5·80	30·72
Meadows	2·17	8·65	6·85	35·52
Strathalbyn	1·03	4·72	3·98	19·28
Myponga.....	1·27	7·88	—	—
Millbrook Reservr.	1·77	7·45	—	—
Murray Flats and Valley.				
Wellington	1·00	3·98	3·60	15·91
Milang	0·93	3·35	3·59	16·08
Langhorne's Brdg	1·09	3·88	3·30	15·27
Tailem Bend	0·84	5·37	3·11	—
Murray Bridge ..	0·85	3·43	3·46	14·32
Callington	0·75	4·24	3·50	15·65
Mannum	0·32	2·39	3·01	11·67
Palmer	0·53	2·52	3·30	15·60
Sedan	0·13	3·54	2·76	11·92
Blanchetown	0·09	1·06	2·72	—
Eudunda.....	0·55	2·09	3·61	10·71
Sutherlands	0·08	1·58	1·99	17·33
Morgan	0·01	1·47	2·19	10·66
Overland Corner .	0·03	3·38	2·93	11·42
Renmark	0·15	4·81	2·56	16·93
Loxton	0·21	6·29	1·83	—
Swan Reach.....	0·04	2·33	2·38	—
Waikerie	0·04	2·59	2·19	9·29
West of Spencer's Gulf.				
Eucla.....	1·60	3·67	3·24	10 13
White Well.....	0·90	3·36	2·00	9·67
Fowler's Bay ...	0·44	2·67	2·26	12·11
Penong	0·45	2·91	2·56	11·93
Murat Bay	0·20	3·06	1·70	—
Smoky Bay	0·15	2·31	—	—
Streaky Bay.....	0·59	3·08	2·63	15·31
Port Elliston	0·39	3·59	2·49	16 49
Port Lincoln	0·39	3·43	3·56	19·88

Station	For April, 1917.	To end April, 1917.	Av'ge. to end April.	Av'ge. Annual Rainfall
West of Spencer's Gulf—*continued.*				
Tumby Bay	0·18	3·80	2·77	15·00
Carrow	0·29	6·14	—	—
Cowell	0·22	4·07	3·09	11·76
Point Lowly.....	0·02	4·19	2·66	12·21
Cummins	0·16	3·44	—	—
Arno Bay	0·32	4·06	2·82	—
Yorke's Peninsula.				
Wallaroo.....	0·36	3·30	3·17	14·05
Kadina	0·29	3·24	3·46	15·88
Moonta	0·32	4·53	3·48	15·22
Green's Plains ...	0·35	3·55	3·10	15·73
Maitland	1·08	5·83	3·95	20·08
Ardrossan	0·48	3·81	2·96	13·89
Port Victoria ...	0·70	5·62	3·09	15·21
Curramulka	0·49	6·45	3·54	18·50
Minlaton	0·35	5·60	3·33	17·41
Stansbury	0·60	6·51	3·34	17·06
Warooka	0·35	6·26	3·03	17·71
Yorketown	0·30	4·85	3·18	17·47
Edithburgh	0·52	4·94	3·39	16·48
South and South-East.				
Cape Borda	0·70	3·67	1·19	25·09
Kingscote	0·44	5·66	3·21	18·95
Penneshaw	0·75	4·40	3·87	21·34
Cape Willoughby..	0·83	4·19	3·71	19·69
Victor Harbor ...	0·92	6·22	4·32	22·18
Port Elliot	0·97	5·67	4·11	20·33
Goolwa	1·26	5·40	3·80	17·93
Pinnaroo	0·32	2·47	3·25	16·74
Parilla	0·50	2·59	—	—
Lameroo	0·61	2·67	3·33	16·55
Parrakie	0·75	3·24	2·54	—
Geranium	0·97	3·76	2·21	—
Peake	1·23	4·59	3·43	—
Cooke's Plains ..	1·29	5·72	3·21	14·74
Meningie	1·16	5·43	3·78	—
Coonalpyn	1·11	5·35	3·61	17·49
Coomandook	1·42	5·36	3·18	16·80
Tintinara	1·13	4·41	3·75	18·78
Keith.....	0·99	4·85	3·43	—
Bordertown	0·76	5·10	3·91	19·76
Wolseley	0·80	3·83	3·57	17·72
Frances	0·72	4·04	3·90	20·74
Naracoorte	1·03	4·72	4·41	22·60
Penola	1·16	5·02	5·17	26·78
Lucindale	0·93	3·49	4·29	23·32
Kingston.....	1·45	4·32	4·48	24·73
Robe	0·94	3·82	4·41	24·69
Beachport.....	1·09	5·04	5·16	27·51
Millicent	1·54	4·60	3·82	29·25
Mount Gambier .	2·68	6·47	6·50	32·00
C. Nrthumberland	2·02	4·74	5·16	26·03
Kalangadoo	1·81	6·09	—	18·87

AGRICULTURAL BUREAU REPORTS.

INDEX TO CURRENT ISSUE AND DATES OF MEETINGS.

Branch.	Report on Page	Dates of Meetings. May.	June.
Amyton	*	—	—
Angaston	*	—	—
Appila-Yarrowie	*	—	—
Arden Vale & Wyacca	*	—	—
Arthurton	*	—	—
Balaklava	*	—	—
Beaufort	*	—	—
Beetaloo Valley	*	—	—
Belalie North	*	—	—
Berri	‡	9	6
Blackheath	839	5	2
Blackwood	837–46	21	18
Blyth	*	12	—
Bookpurnong East	834	—	—
Booleroo Centre	*	4	—
Borrika	*	—	—
Bowhill	*	—	—
Brentwood	*	3	—
Brinkley	*	—	—
Bundaleer Springs	*	—	—
Burra	*	—	—
Bute	*	—	—
Butler	827–33	—	—
Caltowie	*	—	—
Canowie Belt	§	—	—
Carrieton	*	—	—
Carrow	*	—	—
Cherry Gardens	846	1	5
Clanfield	836	—	—
Clare	*	—	—
Clarendon	847	7	4
Claypan Bore	*	—	—
Colton	*	—	—
Coomandook	†	4	—
Coomooroo	*	—	—
Coonalpyn	*	—	—
Coonawarra	*	—	—
Coorabie	*	—	—
Cradock	*	—	—
Crystal Brook	823	—	—
Cummins	833	5	2
Cygnet River	839	3	—
Davenport	*	—	—
Dawson	*	—	—
Denial Bay	*	—	—
Dowlingville	‡	—	—
Edillilie	*	—	—
Elbow Hill	*	—	—
Eurelia	*	—	—
Forest Range	*	—	—
Forster	*	—	—
Frances	†	—	—
Freeling	826	3	—
Gawler River	*	7	4
Georgetown	*	—	—
Geranium	‡	26	30
Gladstone	*	—	—
Glencoe	*	—	—
Glencope	*	—	—
Goode	*	—	—
Green Patch	833	—	—
Gumeracha	*	—	—
Halidon	*	—	—
Hartley	847	2	6
Hawker	*	8	—
Hilltown	*	—	—
Hookina	*	1	—
Inman Valley	840	3	7
Ironbank	§	—	—
Julia	*	—	—
Kadina	*	—	—
Kalangadoo	849	12	9
Kanmantoo	840	5	2
Keith	*	—	—
Ki Ki	*	—	—
Kingscote	*	—	—
Kingston-on-Murray	836	—	—
Kongorong	847	1	—
Koonibba	833	1	—
Koppio	828	1	5
Kybybolite	849	3	28
Lameroo	838	—	—
Laura	*	—	—
Leighton	*	—	—
Lone Pine	826	1	5
Longwood	841–47	—	—
Loxton	*	—	—
Lucindale	*	—	—
Lyndoch	*	—	—
MacGillivray	842–47	—	—
Maitland	*	—	—
Mallala	*	14	—
Mangalo	*	—	—
Mantung	*	—	—
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Meningie	*	—	—
Milang	*	—	—
Millicent	*	8	—

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*No report received during the month of March. † Formal report only received.
‡ Held over until next month. § In recess until termination of war.

ADVISORY BOARD OF AGRICULTURE.

Date of Meeting—June 13th, 1917.

THE AGRICULTURAL BUREAU OF SOUTH AUSTRALIA

Every producer should be a member of the Agricultural Bureau. A postcard to the Department of Agriculture will bring information as to the name and address of the secretary of the nearest Branch.

If the nearest Branch is too far from the reader's home, the opportunity occurs to form a new one. Write to the department for fuller particulars concerning the work of this institution.

REPORTS OF BUREAU MEETINGS.

UPPER-NORTH DISTRICT.

(PETERSBURG AND NORTHWARD.)

MORCHARD (Average annual rainfall, 11in. to 12in.).

March 9th.—Present: 12 members and two visitors.

HARVESTER V. STRIPPER.—Mr. H. Brown read a paper in which he discussed the relative merits of the harvester and stripper, and declared emphatically for the former. With the stripper it was necessary to dump the wheat in a heap and then clean it, either with hand or motor power. The stripper saved a certain amount of wheat, but that was practically neutralised by the damage from rain before the wheat could be cleaned and bagged. The harvester possessed the great advantage of taking off the crop and cleaning it with the same motion ready for the bags. All that remained to be done, before marketing, was to sew the bags and cart them. That meant a considerable saving of expense. If the straw were cut and chaffed and a small portion of bran added it would make better feed than cocky chaff. Mr. Riechstein said that the harvester had helped the farmer considerably during the present wet season. Mr. Longbotham advised using the binder as well as the harvester. Mr. Jasper considered that the complete harvester had many advantages in wet harvests because bags of wheat were more easily protected than wheat heaps. Mr. W. Twigden declared that the complete harvester should never be used in the North. The stripper had the advantage of saving all the cocky chaff, and did not scatter so many wild turnip and charlock seeds. Mr. Gregory said that if the Northern farmers made no other provision for fodder, as a standby, they should save all the cocky chaff. Mr. Kitto was of opinion that the cost of taking off the crop by stripper and winnower was greater than by the complete harvester. If cut with the binder work could be commenced from six to 10 days earlier than with the harvester. Mr. Case pointed out that the harvester was a greater labor saver than any other harvesting method, but care should be taken to store up some straw.

WEPOWIE (Average annual rainfall, 13in. to 14in.).

April 14th.—Present: eight members and one visitor.

QUALIFICATIONS OF A FARMER.—In a paper on the qualifications of a farmer, Mr. P. Burns, jun., observed that the two principal features which should recommend farming to the young man were (1) its comparative certainty of success; and (2) the hopefulness of the future. The farmer required the ability to determine how to work the various classes of soil on his property, judgment in tillage, the use of fertilisers, and the selection of crops. Even poor land might produce profitable returns if cultivated according to the most suitable methods. There had been great progress of late years in labor-saving agricultural implements, and therefore the farmer required to make good use of his brain before becoming an expert in the use of them all. In dairying the farmer required sound judgment for the selection of stock and knowledge in the feeding and treatment of cows, pigs, and poultry. The farmer should be methodical, and should be industrious and attend to his own duties regularly. The avocation of a farmer required brains and intelligence, because he was stock he required some knowledge of the symptoms and treatment of common complaints to which they were subject, because at times it was difficult to obtain the assistance of a veterinary surgeon.

MIDDLE-NORTH DISTRICT.

(PETERSBURG TO FARRELL'S FLAT.)

CRYSTAL BROOK (Average annual rainfall, 15.62in.).

April 10th.—Present: 20 members and two visitors.

ENSILAGE.—Ensilage, declared Mr. R. S. Booth in the outset of a paper on ensilage, had the advantages over hay that it preserved the foodstuff in a green and succulent form, and at the same time maintained its full weight as a green fodder in comparison with the weight which was dried out in the curing of hay. Under existing conditions the mass of natural herbage which was available in the spring was, under ordinary conditions, wasted (dried and blown away as with Cape weed, clover, &c.), or dried and became a harbor for vermin or a menace by providing fuel for bush fires. In ensilage that which was at present wasted could be cheaply and easily converted into profitable stock food, which once stored away was safe for practically all time if stored in properly prepared silos, or, at least for one year in the form which, under present circumstances he would advocate. He would specially recommend that that form of fodder be kept for the milking cows, because it was a proven fact that it increased the quantity and quality of the milk by, in some cases, 100 per cent., and was practically unexcelled as a summer, autumn, and early winter feed. During the past season he had observed acres and acres of feed up to 2ft. high, especially on the Broughton Flats—which, shortly after the advent of summer, had shrivelled and in most cases disappeared. Where it has not disappeared it was found to be a fine harbor for rabbits. A farmer excused himself from making ensilage because he only kept a few cows for his own use. But even so, was it not their bounden duty to get the best out of whatever they kept. In early spring they had plenty of butter and milk, and during that time supplied the town, but in winter they bought at exorbitant prices that which with a little foresight and labor they could produce at a quarter the cost, namely, by conserving the excess of natural herbage during spring. That could be done when other farm practices were not pressing. He did not intend to dilate on the growing of special crops for ensilage, his aim being to induce them to conserve that which Nature provided in abundance. The best time to cut was just when the herbage was flowering, in order to secure the maximum of feeding quality. The cutting should be done when the herbage was externally dry, that was, not immediately after rain or heavy dew. When cut it should be placed in the stack or silo as soon as possible. A good practice was to cut in the morning and stack in the afternoon, clearing up each day. Silos were of various kinds, but they could be grouped generally into the following:—(1) Underground type; (2) overground; (3) semi, half under and half above; (4) stacks. 1. Underground.—Those needed to be cemented, and also to have a movable roof, which could be pushed or lifted away when filling and emptying. He did not intend to dilate on that form of silo, or Nos. 2 and 3, reserving the full description of them until the farmer had tested and found the advantages to be gained by conserving fodder in the form of ensilage. However, one great advantage which a properly constructed silo had over other methods, was that the fodder could be chaffed before storing. The methods he would advocate—for a trial—on the ordinary farm, was that of stacking. In some cases an excavation was made, but he was not at all in favor of that, because should the silage not be all used before the winter set in it would stand a very great chance of being spoiled. He advised that the fodder be cut and stacked much in the same manner as loose hay. He preferred the mower, because it mixed the various grasses, &c., together better. Over each layer it was necessary to spread some salt, the amount depending on the size of the stack, but the ordinary run of farmers could judge the amount fairly accurately. This salt tended to preserve the fodder and also make it more appetising and beneficial to the stock. Before commencing the stack he advised the placing of a good foundation of say 1ft. of straw. When sufficient had been cut, carted, and stacked the top should be covered (the last layers being rounded off) liberally with straw, and wires placed over it with weights attached on each side (stones, old iron, logs, or anything handy sufficed for weights) at a sufficient height so that, as the stack settled they would not touch the ground. It was best to start with slight pressure and increase it gradually by attaching more weights. When opening for use at a later date it was well to do so in sections, taking each section through to the ground before commencing a new one. They would find that stock relished it. He had seen the practice he recommended carried out, and the ensilage was to all intents and purposes equal to that which he had seen come out of a first-class silo. The advantage of the latter over the stacks was, as he had

said before, chaffing and keeping qualities. Ensilage, besides being an excellent fodder, tended to keep the stock in good health, because it retained all the qualities of the green feed. Members favored the stack system, though only two persons in the district made a practice of storing fodder in that manner.

MINTARO, March 10th.—Mr. D. Kelly led a discussion on the results of last season. He said that the season was an extraordinary one, and calculations should not be based entirely on its results. He referred to the seeding operations and fallowing, and also to the wonderful spring and the remarkably cool summer. He pointed out the bad condition of the fallow, and that it would be profitable to employ an extra team working the fallow during the spring and autumn to keep down the weeds. In regard to sowing, he said that it paid to sow thickly because the wheat stood up much better though it did not head so well, also 1½cwts. of super. per acre would do no harm. Mr. J. Thomas considered that 1cwt. of super. was sufficient. Mr. J. Pearer had as good a crop when he sowed 50lbs. as when he used 1½cwts. of super. Mr. S. Garrard considered that it was better to use 2cwts. of super. It was agreed that 1½bush. per acre was the right amount to sow. Mr. A. Sandow said that he got three more bags to the acre when he sowed with the land wet than when he sowed with it dry. Mr. Kelly advocated reaping in the morning when the wheat was a bit tough. For wheat he liked Crossbred 53 and Federation.

WHYTE-YARCOWIE (Average annual rainfall, 13.91in.).

April 14th.—Present: eight members.

WHEAT GROWING AND STOCK RAISING.—On a small farm, say under 1,000 acres, declared Mr. G. F. Jenkins, in a paper on wheat growing and stock raising, stock alone in that district was not profitable. Success was not possible without keeping keping sheep and properly cultivating the land, its carrying capacity would be greatly improved. The raising of sheep was a safe proposition because the prices of wool and meat were not likely to be materially reduced for some years. For breeding fat lambs for the market he preferred Crossbred ewes, though the fleece was not equal to the Merino. The greatest difficulty was in regard to the fences, but a six-wire fence was efficient in most cases, and those which got through it should be sent to the butcher. Crossbred ewes were quiet, good mothers. Selling lambs as suckers weighing from 36lbs. to 44lbs. was more profitable than keeping them for hoggets. Farmers should breed their own horses from their best mares. In that way they would not be as likely to get outlaws, as they would if they bought their horses. Mr. E. J. Pearce favored the Merino ewe because it was a much better sheep for the fences. The most difficult problems for the small farmer were the stocking of the farm and tiding the sheep over the dry months. Mr. Mudge preferred the Crossbred ewe because it was quieter than the Merino, and did not trample the feed about so much. Mr. Green preferred the Merino-Leicester cross, because of their breeding qualities and their good fleeces.

MINTARO, April 7th.—Mr. T. J. Horgan delivered an address on the care and feeding of farm horses, which was generally agreed with.

MUNDOORA, April 9th.—In the course of a general discussion on various subjects Mr. Stephenson recommended farmers to have their soil analysed in order to ascertain what plant food materials they were deficient in with a view to supplying same.

LOWER-NORTH DISTRICT.

(ADELAIDE TO FARRELL'S FLAT.)

NORTHFIELD (Average annual rainfall, 19in.).

April 3rd.—Present: seven members and two visitors.

NEW ZEALAND FLAX AND ITS TREATMENT.—New Zealand flax (*Phormium tenax*), remarked Mr. F. Chardon in a paper on New Zealand flax and its treatment, was native to New Zealand, but was also found distributed in other parts of Aus-

tralasia. It has been introduced into several European countries, and was cultivated to quite an extent in North America. The chief difficulty had been to find a means of dressing the flax, and the New Zealand Government was offering a substantial bonus for an improved process of treatment. The fibre of New Zealand flax was very white in color, soft and flexible, and possessed a very high finish. The leaves of the plant reached over 6ft. in length, and under the present method of treatment the amount of fibre obtained was from 10 to 14 per cent. of the weight of the leaves, although the latter contained as much as 20 per cent. fibre. The fibre was principally used in the making of rope, twine, matting, &c., the best of it being woven into cloth. It was also largely used in America in connection with fibrous plaster work in which it played a very important part. The plant grew naturally in swampy soil, and it was only of late years that it had been found that flax repaid cultivation, and moreover, grew better and more firmly on good ground than on swamps. On sandy ground or near the sea, while the leaf did not grow to the height it attained on the swamp lands the fibre was tougher, and the plant generally of a more hardy nature. The plant grew in clumps, composed of fans, each fan containing from 10 to 12 blades or leaves. In gathering a man with a sickle hook was able to cut and tie from three to four tons per day. It was tied in bundles weighing about 1cwt. each, and then carted to the mill to be stripped. Stripping meant freeing the vegetation from the fibre, and was accomplished with a machine having angle beaters on a drum. The flax was fed into the stripper, two blades at a time, and passed between the drum (which had a necessary speed of 1,600 revolutions per minute) and a beating bar, thereby loosening the vegetation from the fibre. After passing through the machine it was separated into fair-sized hanks, then passed it on to a "shaker" who "cracked" each hank to free it from all loose vegetation. The next process was washing. After being thoroughly shaken it was put into a trough with running water. Each hank was hung on a peg and scraped. It was then carted to the paddocks and spread in rows to be bleached, and within a week or more, with fair weather, it was bleached white. A bonus had been offered for a process that would avoid the bleaching by paddocking, because the former was too uncertain, and with bad weather it had a tendency to weaken the fibre. When properly bleached it was brought in for its final treatment, an operation called "scutching." The "scutcher" was a large box-like machine, having wooden beaters revolving inside. The action of the "scutcher" thoroughly cleaned away all vegetation remaining, and gave the necessary finish to the commercial article. As the fibre was passed into the "scutcher" it was firmly held, and one end being done, it was then reversed. It was then baled ready for an ever-waiting, ever-growing and an ever-unsatisfied market. The grower could forward it, feeling confident of obtaining an excellent return and a certain profit. The short ends which the "scutcher" combed out were called "tow," and were used chiefly for the cheaper class of twines, bedding, &c. It had a commercial value of about £6 per ton. At present the price of New Zealand fibre for G.F.A. was about £37 per ton. When the amount and value of the fibre exported were considered it would be seen that the industry was very vital to New Zealand. For the year 1916, with limited freights and shortage of labor, 27,674 tons of flax, valued at £1,001,725, were produced. Mr. Neely, who has recently come from the North of Ireland, where he said the best flax in the world was grown, declared that the paper was most interesting, though everything connected with it seemed entirely different from the flax in Ireland.

SALISBURY (Average annual rainfall, 18.57in.).

April 3rd.—Present: 13 members.

ALMOND GROWING.—In a paper on almond growing Mr. A. G. Jenkins described many of the botanical characteristics of the tree, and referred to the range of its cultivation. The range of varieties of the almond, he said, was as wide as the scope of its cultivation. The oldest variety seemed to have been the bitter sort, which was still used in commerce, but gradually that had been toned down under the influence of environment, &c., until the sweet-kernelled variety made its appearance. The almond would do well on a variety of soils with 16in. rainfall or more—in fact, in almost all, except sour or swampy localities. The climatic conditions at flowering time seemed to affect the crop a good deal, and it would seem to be unwise to plant extensively in localities which were liable to very severe frosts. As a rule, when almond trees were planted, most people, knowing their reputation

as hardy trees, simply made a hole big enough to cover the root system, and put them in. But it was as well, in order to secure the best results, if planting extensively, first to subsoil the land; or, if planting odd trees, to dig a hole 18in. square, and loosen to a depth of 15in. Before the tree was planted a shovelful or two of rotted manure or a handful of bone super. sprinkled in the hole would give the tree a better start, and secure better results than a tree stunted at the beginning. For the first three or four years it was needful to prune the young trees to make their natural spreading or upright habits conform to the ideas of the grower. After that a little thinning out occasionally would suffice. When the trees were planted in block formation it was desirable to plant from 20ft. to 30ft. apart, according to the richness of the soil. When planting in rows around the edges of paddocks 10ft. was about a fair distance. A good ploughing and harrowing in the early spring, when the soil was in good condition, was almost all that was necessary in the way of cultivation unless heavy rain should fall later, when cultivation might be beneficial. When trees were planted in rows as breaks ploughing out from the trees about June, and turning it back again about September usually provided a lasting tilth if the soil was in the right condition. He then dealt with the characteristics of different varieties, and stated that the weight of kernel compared to weight of shell in almost all the varieties mentioned was more than the Brandis and that of the Hatcho, Nonpariel, and an unnamed seedling, the highest. That in conjunction with the bearing qualities of the tree should be taken into consideration if the nuts were to be cracked for sale, but since nuts were mostly sold in the shell, the variety which returned the greatest weight of nuts per tree, providing the other qualities were up to standard, was the one to grow. From tests made in California on 10-acre blocks with I.X.L., Nonpariel, and Ne Plus Ultra over a period of three years, started when the trees were three years old, the Ne Plus Ultra was first, then Nonpariel and I.X.L., the yearly average being 82lbs. per tree. That result might be altered slightly under the conditions in that district, and probably some of the local varieties would do as well or better. Anyone who contemplated almond growing should first ask himself the question does it pay? If 80 trees per acre were planted, it would be fair to assume, over a period of 10 years, that there would be a return of, say, 2lbs. per tree per year average, which would be absurdly low. That yield, at 6d. per lb., would return £4 per acre per year. That was for the first 10 years. Subsequently double that income should be received, and it should be increased as the trees further developed. Those returns should be obtained from very ordinary soils. As a profitable sideline almond growing should commend itself to most people on the land, and as a main item it was certainly not to be despised. In the discussion the opinion was general that almonds did not flourish in wet and low-lying places, and that whilst trees might be grown to advantage in what would otherwise be waste spaces as a breakwind the cost of the gathering would render it unprofitable as a main crop.

FREELING, March 8th.—Mr. E. Morris propounded a scheme for establishing a co-operative horse-breeding society, consisting of 20 members, who would each subscribe £15 15s., yielding £315, which would be used to purchase a high-class stallion, whose services could be secured for the mares of members at £2 2s., whilst non-members paid £4 4s. Mr. Neldner said that the district was unsuitable for horse breeding on the lines indicated. It was finally resolved that Mr. Morris be asked to interview farmers in the district, and endeavor to secure a sufficient number of members to form a society.

LONE PINE, April 3rd.—Mr. J. G. Hoffmann read a paper on the handling of colts, in which he urged that a colt should not be handled until it was three years old, and that the operation should be conducted with great kindness to ensure the best results. The colt should be lassoed or put in a crush pen and then bridled. It should then be taken into the open and mounted. Afterwards it should be harnessed singly to a log weighing about 1cwt. for a couple of rounds or more, and later on it might be tried doubly with a quiet horse, using the whip as sparingly as possible. The colt should always be spoken to in a strong, commanding voice. Mr. O. Lehmann considered that a colt could be handled when 2½ years old. It would take four weeks to break in a colt. Mr. Walter Schmaal advised the practice of tying up young colts when foals.

ROSENTHAL, April 4th.—Mr. S. C. Davis read an exhaustive paper on the bulk handling of wheat.

YORKE PENINSULA DISTRICT.

(TO BUTE.)

MOONTA (Average annual rainfall, 15.22in.).

April 11th.—Present: 14 members.

BEST METHODS OF CULTIVATION.—In a paper discussing the best methods of cultivation, Mr. W. J. Brinkworth said that it was best to commence the summer fallowing as soon as the harvest was finished, but winter fallowing should be commenced as soon as seeding operations had been finished. The longer the soil was exposed to the influence of the sun and atmosphere the better chance there would be of a good crop. Fallowing operations frequently failed through late commencement, and afterwards by giving too little working, so that the soil was left rough and cloddy, and the rain absorbed by the clods quickly evaporated, instead of being retained for the use of the wheat plant. Fallowing with the cultivator had been done recently with very satisfactory results, because it left the ground fine instead of cloddy, thereby providing a better seed bed. He would not recommend cultivating red soil which set hard, but would rather plough it. He knew an instance of 30bush. per acre being reaped this season from cultivated fallow. All fallow should be well worked in order to provide a good seed bed before being sown. The soil should be well worked before drilling was commenced. The wheat should be drilled in about 2in. deep, a bushel to the acre, with say 80lbs. to 100lbs. of phosphate manure. Afterwards the land should be harrowed with a light set of harrows if the seed were not covered, to prevent the mice and birds from devouring it. Fallowing in a dry season should be started and worked down as soon as it was ploughed before the lumps or clods got dry. If it were over dry when it was ploughed a good plan was to roll it the same day, because that would crush it down and help to retain the moisture. As soon as a shower of rain fell the land should be harrowed. All fallow should be well worked to keep down all weeds and make a good seed bed. If no rain fell after fallow, as sometimes happened, sowing should be deferred until there had been rain, and the ground had been worked while wet, otherwise it would be too loose. Sandhills should be ploughed as soon as seeding had been finished and sown with oats or some other fodder which could be cut for feeding purposes, or it could be fed off. That would prevent drift. Mr. W. Edge said shallow fallowing was best in that district. It was a mistake to fallow too great an acreage. It would be more advisable to fallow a smaller area and work that area well. Mr. A. B. Ferguson observed that all country must be worked according to its nature. He favored summer ploughing because when the rain came it absorbed the moisture and made the soil nice and soft. He favored working fallow directly after harvest. It then retained the moisture better, and would yield fully a bag of wheat to the acre more. He also favored shallow ploughing because it kept away from the rubble bottom, but if the land were heavy clay it could be ploughed more deeply.

WESTERN DISTRICT.

BUTLER (Average annual rainfall, 16.61in.).

April 10th.—Present: nine members.

PICKLING WHEAT.—In a paper dealing with the pickling of wheat Mr. A. H. Plitzner observed that the first essential was the cleanliness of the seed. It should be free from all waste matters, including whiteheads, which had a far-reaching effect in producing the odd grains of smut so frequently found at harvest time. Although wheat appeared to have had a good soaking he had examined whiteheads closely, and found the chaff packed so closely around them that they had never received a touch of the pickle. That meant that the whitehead was sown without pickle, and the result was the odd grains of smut found in the crops. Pickle should not be less than 1lb. of bluestone to four gallons of water, or 1lb. of bluestone to every 6bush. of wheat. The pickling should take place long enough before sowing to enable the seed to dry, thus assuring an even flow through the drill. The consensus of opinion was that 1lb. of bluestone to 4galls. of water was much too strong, 1lb. to 10galls. being the correct amount. Mr. C. F. Jericho observed that as a grain of wheat

had a certain amount of grease, luke-warm water would be more penetrating. Mr. P. Parker said that he added one pint of salt to his pickle of 1lb. of bluestone and 10galls. of water. Mr. R. Barr, jun., mentioned a system of dry pickling.

SEED WHEAT.—Dealing with the question of seed wheat, Mr. J. Owen, in a paper, said that after the proper preparation of the soil the seed was the next essential circumstance, and the variety of wheat most suitable to the district was the first consideration. Each farmer had a "pet" wheat, or one or two varieties which he found gave the best results over a number of years. How to make the best yielders better was the next thing, and that could be accomplished by selection—that was, by going through the best portions of the crop and picking the heads of the best-looking plants. Great care should be taken in selecting only ripe heads. It would be necessary to secure about 14lbs. of grain, which should be winnowed by hand and cleaned thoroughly. The seed so gathered should be sown broadcast in a 1-acre plot of good clean well worked land with a good dressing of, say, 60lbs. super. When that crop was ready to reap it should be gone through, and another 14lbs. of the best heads selected as seed for the next year's plot. If that operation were continued for a few years the wheat from the plot would be found to be far superior to that first planted. The wheat reaped from the plot could be used for seed to sow in the paddocks. All grain intended for seed should be thoroughly ripe before being harvested. It should not be allowed to remain on the damp ground, but should be stored in a dry, well-ventilated barn; otherwise weevils might cause trouble. It should be cleaned thoroughly and graded in order to remove all small and cracked grains, also all foreign seeds, such as charlock, &c. Having got good clean healthy seed, the next thing was to pickle it with a view to protecting the crop from bunt or smut. Various substances could be used for pickling, such as lime and salt, sulphate of soda, copper sulphate, formalin, carbolic acid, &c., but the best and most widely used was copper sulphate, or bluestone. There were various methods of pickling with bluestone adopted, each method having many supporters, but the method he favored was a solution of 1lb. of bluestone and 10galls. of water in a wooden barrel. When wheat was sown under dry conditions of soil it was best not to pickle. If the seed was pickled there was danger of malting. It was always advisable to clean one variety of wheat from the drill before putting another variety into the box if it were intended to obtain next year's seed from that crop. Mr. Barr said that he preferred bran bags to super. bags for use in pickling. Some members considered that pickled wheat was less liable to malt than dry seed.

KOPPIO (Average annual rainfall, 22.40in.).

April 3rd.—Present: seven members.

INCREASING THE STOCK CARRYING CAPACITY OF THE HOLDING.—Under this heading Mr. G. B. Gardiner read a paper in which he expressed the opinion that clear land, which was bearing good natural grass, could be used as pasture instead of being broken up and that those portions covered with scrub and undergrowth should be cleared and cropped, especially as much of it was fairly good agricultural land, capable of carrying stock. The gum country, which was good strong land, would return a good profit if cleared. In clearing he recommended barking the trees from the ground, a distance of 18in. up the butt, which was more successful than girdling, because the latter operation always induced new growth below the girdle, causing considerable trouble to remove. A tree which had been barked took a year to die, but that was the end of it. There was a large area of land in that district which, if treated in that way, could be converted into excellent grazing land, and double the stock-carrying capacity of the district. Members agreed with the writer's view of barking gum trees. Land on which the gum trees had been rung came into grass much more quickly if the bark and rubbish were left upon it unburned. Mr. R. F. Richardson recommended the conservation of the sheoak trees, which were dying out. They were the only edible trees for stock they had.

MILTALIE (Average annual rainfall, 14.55in.).

March 3rd.—Present: nine members and two visitors.

SAVING ODDS AND ENDS.—A paper was read by Mr. H. R. Jacobs on the saving of odds and ends on the farm. He pointed out that, owing to the increased cost of all farming material, the strictest economy was essential. When bolts and parts of

machinery were broken they should not be thrown away. The nut and washer should be hung on a wire, and would become useful sooner or later. By the use of a stock and die a new thread could be put on the bolt. Pieces of chain, leather, timber, nails, iron, and hoop iron, &c., should also be saved. In connection with the bag lifter, hoop iron was a capital thing to use in place of the chain, being strong, and much easier to run the truck over. Hoop iron was also being used in place of chain for general work. Those who used it contended that it did not rub the horse's sides so much as chains. If corasacks were left lying about mice would render them useless, or, if exposed to the sun and rain they would soon rot. Seed wheat bags should, when emptied, be turned inside out, well shaken, then bagged up, tied, and hung in a dry shed by a piece of wire at least 2ft. from the ceiling. Care should be taken not to mix them with the super. bags. If super. bags were washed when emptied they could be used for some purposes, but the use hardly repaid the time and trouble of washing. Mr. D. Bagnell considered that time was one of the odds and ends which should be made the best use of. Great care should be taken of bags. They should not be left lying about to spoil. Mr. W. E. Iler believed in saving broken bolts. He was averse to using hoop iron for mending harness, but it might be used in place of chain on the bag lifter. Mr. E. Story advocated the care of nails as well as bolts. Mr. L. Aunger would not lose time in saving bolts and nails, but would use hoop iron.

MILTALIE (Average annual rainfall, 14.55in.).

April 7th.—Present: 11 members and one visitor.

SEEDING OPERATIONS.—Owing to the increased cost of production, remarked Mr. Lionel J. Aunger, in a paper on seeding operations, combined with the difficulties of disposing of produce, it was essential that seeding operations should be conducted on the most economical lines in order to realise a profit. By working on economical lines he did not mean drilling the seed into the ground without the necessary cultivation, in order to get a large acreage cropped. The principal consideration was the preparation of the seed bed. Every success or failure which appeared throughout the district during harvest time was invariably an argument in favor of good cultivation. As a rule the preparation of the soil was not commenced far enough ahead of seeding time. Even on comparatively new land it was advisable to fallow, and when the farm became older they could not expect a good crop without it. When fallowing advantage should be taken of every rain and as much of the land as possible worked over before it became too hard. He did not favor deep ploughing. On the lighter soils the best were right on top, and would not grow a good crop if the lower poor soil was turned up. The better soil, which had a greater depth, was heavier, and to plough that deeply was expensive and too slow. Their limited rainfall compelled them to finish ploughing quickly, and harrow or cultivate the soil before it became dry. If the second growth of weeds was not too great the mouldboards should be taken off the twin plough, and it was equal to an excellent cultivator. Where the surface soil was becoming worked out it was advisable to work more deeply occasionally, because although the immediate returns were lessened eventually a benefit would be derived. As few stumps as possible should be pulled out at seeding time, and the draught should be put on for fallowing. New land should be sown early with a wheat that would stand up well, such as Yandilla King or German Wonder. Late wheats should be sown early, and early wheats late. Oats should be sown before wheat, and barley, if for grain, last. The most should be made of the good land. It was inadvisable to sow a crop among stones and bushes if good land were idle. On good clean fallow it would be profitable to put not less than 1cwt. of super. and Horsh. wheat. Seed wheat should be free from barley, oats, drake, and smut. When pickling seed two bags of wheat should be made into three lots, and each dipped into a cask of bluestone solution—not less than ¼lb., and not more than 1lb. of bluestone to 10galls. water. The wheat when dipped should be drained on a sheet of galvanized iron arranged so that the solution should run back into the barrel. The cask should be sunk halfway in the ground in order that a man might stand over the cask and lift the wheat out easily. They could not expect to farm successfully without sheep. Only those farmers who had no sheep knew how difficult it was to keep fallow clean without them. It was unfortunate that so many wheatgrowers were not in a position to leave land out for grazing instead of cropping with wheat until takeall ruined it for years. The quickest way to get rid of takeall was to burn stubble, fallow

early, kill all weeds, only work the land wet, cultivate as shallow as possible in order to leave the land firm, stock heavily to enrich the soil, kill weeds, make surface drift, and use more super. If the land were sandy and thistles grew well on it oats should be sown at the rate of 1bush. to the acre with super. If the oat stubble were burned the land could be either left out for feed, a self-sown crop, or fallow. A few oats on fallow did little harm if they were not allowed to seed. Wheat should not be sown before the rains came. It was better to be late with the seeding than to sow dry. Mr. W. G. Smith endorsed the suggestion for a heavy dressing of manure on the stiff soils in that district. Mr. P. J. McEachen did not agree with the suggestions as to pickling wheat. Mr. J. S. Jacobs was averse to using a cask for pickling wheat. Mr. T. J. P. McEachen favored the light working, because it was less expensive and less strain on the team. He did not favor the heavy dressing of super. Mr. J. P. Story would not always give a heavy dressing of super. He had used a cask for pickling wheat, but was not quite sure that it was the best method. Mr. H. R. Jacobs said that if the land to be cropped were fallowed the heavy work at seeding time was lessened. He advocated the use of large implements because they saved labor, and he believed in getting the crop in as early as possible. Mr. W. E. Hier said that it would pay to use plenty of manure.

MINNIPA.

February 10th.—Present: nine members and two visitors.

THE CROSS BREEDING OF FOWLS.—There were 95 different breeds of fowls, observed Mr. C. H. Cooke in a paper on the cross breeding of fowls, and, he continued, some were noted for their superior quality as table birds, and others for their laying capacity. The Leghorn was first class as a laying fowl, but not a good table bird. A cross of the White Leghorn and Orpington produced a good table bird and a very fair layer. Another cross was the Rhode Island Red and the Leghorn, which gave fine table birds and was also a profitable laying strain. The Rhode Island Red was an American breed, large in size, very dark buff color, with yellow legs, and a valuable all-round breed. The Orpington was an English composite breed, and one of the most popular of the day as a good all-round fowl for the farms. They were very good layers and made a good cross with the White Leghorn. They were fowls that did not fly on haystacks or scratch about the yards like many other light breeds, and therefore they were not so destructive as the barndoor breeds. Another cross for table birds only was the Indian Game (a huge-boned member of the Game family; very heavy, and a fair layer) with the Dorkings or Orpingtons. The cross produced table chickens, good sitters, and excellent nurses. Another cross was the White Leghorn with the Black Minorca, the resulting product being a good laying bird and very hardy. The Minorcas were one of the best breeds of domestic poultry.

MINNIPA.

April 7th.—Present: 11 members and three visitors.

THE SEEDING OF WHEAT.—To produce the best results in wheat growing, remarked Mr. L. J. Cook in a paper on the seeding of wheat, it was essential that strict attention be paid to the seeding of the grain, and, where possible, only proved methods and practices should be adopted. Reports were often heard of farmers obtaining splendid yields, and sometimes exceptional ones, from crops which had been seeded without practically any care or thoroughness, but it would invariably be found that it was the farmer who adopted proved methods, and performed them thoroughly who would produce the greatest results over a decade of seasons. Firstly the principal function in the seeding of wheat was the preparation of the soil for the reception of the grain. The wheat plant was one of the most hardy plants to grow, and could be successfully produced under widely varying climates, but like all other farm and garden plants, to obtain maximum results it was necessary to prepare a good seed bed. With the climate with which the greater part of South Australia was favored the widely adopted practice of bare fallowing lent itself admirably to the formation of an ideal wheat seed bed, viz., a firm, well subpacked soil, with 2in. to 3in. of loose crumbly soil on the surface. Theoretically explained, that condition was to provide an evenly distributed, freely accessible, and

available supply of plant food for the use of the roots of the wheat plant, and to provide a medium in which the roots could secure a firm hold and be enabled to help the plant better to withstand adverse outside influences. The land was ploughed up to an even and as great a depth as economically possible to allow air, warmth, moisture, and carbonic acid gas to penetrate into the soil, and so act upon the soil constituents and prepare them into available forms for the plant to use as food. Thereafter, with the various workings, the aim was to consolidate the under layers and avoid leaving loose open spaces beneath the growing plant, because they were very detrimental to its health. When the soil had been nicely consolidated evenly throughout the moisture containing the plants food could move more readily through it by capillarity, and when the soil was close around the roots they could find their food close at hand, whereas, with an open soil, the moisture had difficulty in rising and permeating it, and it was impossible to have an even distribution of the plant food and moisture. The advantage of maintaining a good sturdy and continuous growth would be appreciated, hence the advisability of preparing the soil so that it would not check the root growth, which must affect the health of the plant. With regard to the depth of ploughing, wheat was a deep rooting cereal, and therefore necessarily required deep ploughing, and, where early fallowing was practised, the land could be safely turned to a good depth, the late winter and spring rains being sufficient to consolidate the under layers. Where, however, late fallowing was availed of, or where new land was being cropped, it was necessary, if deep ploughing were adopted, to consolidate the under layers artificially by means of a good heavy roller. That operation was expensive, especially since it might probably require the roller to be put over the land a number of times to secure the desired effect. Therefore, in sowing new land in particular it was generally advisable to plough shallowly 2in. or 3in. a month or six weeks at least ahead of the drill. By so doing the aim was to sweeten the surface inches, but at the same time that practice tended to make the crop comparatively shallow rooted. In country such as in that district where scrub fires did not have an even effect over the soil, it was advantageous to stir the ploughed surface again with a scarifier, harrows, or cultivator prior to drilling. With regard to the actual depth of ploughing when fallowing early, as yet sufficient data was not available to enable a reliable result to be quoted. The matter was being tested at Roseworthy, and during the last few years, the results showed a gradual increase in yield from the most shallow ploughing (2in.), to the deepest ploughing (12in.), but the increase had not been sufficiently great to warrant the expense of very deep ploughing. However, when the test had been carried over a greater number of seasons, it was quite expected that at any rate an occasional deep ploughing would be amply repaid. In that district, with the initial fallowing, it was advisable to plough 4in., and then gradually extend the depth of fertility with each successive fallowing. In dealing with the working of fallowed land, time would not permit of detail in that paper, but such working should always aim to maintain the surface soil in a crumbly, not powdery, condition and free from weeds, as well as to secure a consolidated under surface. It should always be remembered that even ploughing, even cultivation, and even drilling meant a more even crop, and an even crop meant an even yield. Therefore they should plough into the hard patches and maintain the drill hoes clear and free running, &c. Whilst on that point they should note the drawback to disk implements, which worked the under layers of the soil very unevenly, and cut the soil particles very fine. With reference to the time at which to sow wheat, that would naturally vary with the seasons and conditions, but in that district it would be advisable to sow as early as possible after the first substantial rain in autumn. The soil was in the best condition to receive the seed when it was in a moist and friable state, but that nice condition was not always possible, and a certain amount of dry sowing was unavoidable, but it should not lead to any very harmful results whilst the land was new and free from weeds, but after the first crop it would be well to avoid it as much as possible. Care should be taken to avoid the malting of the grain, and seed should not be sown into soil that was only slightly moist. Personally he recommended sowing after the first good fall of rain in April, but should rain hold off he would not delay operations long into May. Only the best seed should be sown. With plant life, as with animal life, the best parent produced the best offspring; therefore, whenever possible, selected as well as graded seed should be used. If such seed were used it would not be necessary to introduce a change of seed from time to time. Varieties varied with the climatic and soil conditions, and it was only

by systematic experimenting that the most remunerative variety could be discovered for each especial district. In countries and districts having long winters and short summers wheats of long period of growth returned the greatest yields. Those wheats crept about the surface of the soil longer, and tillered more extensively than the early, quickly-growing wheats. In countries of short winters and long summers it was found that early, quickly-growing wheats returned the greatest yields, as they were more towards maturity, and therefore not so badly affected, should the summers set in quickly. Further, it was necessary to consider the fungus disease of red rust. The early wheat usually secured a lead over that, and was therefore more or less rust resistant. Other points to consider in selecting varieties was the strength of straw, especially in rough-weather districts, and the holding capabilities of the chaff. Up to the present it had not been sufficiently advantageous for the farmer to seriously consider the strength of flour of wheats. For that district the best results should be secured by growing early wheats such as Gluyas and King's as bulk plots, with a smaller area of a good rust-resisting mid-season wheat such as Queen Fan. The quantity of seed to sow for a grain crop was dependent on the class of wheat, the strength of soil and climate, and the time of seeding. Early low tillering varieties required a thicker seeding than the slower growing greater tillering class. Rich soils would stand a heavier seeding than poor soils. Similarly lands of heavy rainfall could carry more plants to maturity than those of light rainfall. Dry sown and late sown crops required to be seeded a little more thickly than crops which were sown when the soil was in a nice moist friable condition. Really the point with regard to the quantity of seed to sow was like the choice of variety, best decided by practical experience in each respective district. Considered theoretically, they sowed wheat very thickly. For instance, when they sowed 60lbs. of seed to the acre, it meant that they only required for every seed sown to harvest 30 similar grains (only a medium-sized head of wheat) to produce a 30bush. crop, and if they grew wheat plants a link apart they should require only average plants, *i.e.*, plants producing six-headed, averaging about 35 grains per head, to produce the 30bush. to the acre. From that it was easy to see what large results could be obtained when wheat was grown under good garden conditions, where it was easily possible to secure up to 80 or 100 stools per plant. However, from an economic point of view such a procedure was out of the question, because wheat must remain a cheaply-produced crop, and hence they sowed comparatively thickly to avoid costly seeding, and after cultivation treatments. He recommended in that district, sowing the early wheats at the rate of 60lbs. per acre, and the mid-season and later wheats at the rate of 50lbs. per acre. With regard to the depth of sowing, 2in. was plenty. In light soils it was advantageous to go a little more deeply. It was necessary to follow the drill with a light harrowing to ensure that the seed was covered uniformly. Mr. E. J. Turley did not favor Gluyas as a bulk crop, because of its great tendency to lodge. Mr. G. V. Lindquist agreed that Gluyas was a risky wheat, especially on stumpy land. He greatly preferred King's for that district. In answer to a question Mr. Cook said that he recommended 1cwt. of super. to the acre as a general dressing of manure for that district.

SALT CREEK.

April 5th.—Present: nine members and three visitors.

WILL PIG-RAISING PAY ON WEST COAST FARMS?—A paper was read by Mr. W. H. Gale in which he discussed the question whether pig-raising on the farm would pay on that side of the gulf, and he answered the question in the negative, because the care of the pigs entailed so much work that it would be necessary to neglect other duties or work very long hours. Besides that the expense of getting the pigs to Cowell and thence to the Adelaide market was about 12s. 6d. each. The pigs should be sold when about six months old, because if properly cared for they would then weigh 70lbs. or 80lbs. After that they did not improve quickly in proportion to the quantity of feed which they consumed. If there were a bacon factory on that side of the gulf the pigs might pay. Mr. W. Lee, sen., thought it would pay farmers to keep pigs for their own use.

YALLUNDA (Average annual rainfall, 18in. to 19in.).

March 31st.—Present: four members and two visitors.

SHEEP ON A FARM.—Sheep were one of the best paying lines on a farm, declared Mr. R. B. Jenkins in a paper on that subject, if they were worked to the best advantage. It was essential to obtain as good a class of sheep as possible. He

favored getting ewes cast because of their age from some well-known sheep farmer because they would be found better than young ewes procured from the same source, since sheep farmers would only sell the culls when young. It was also imperative to get the best ram procurable. Of course that depended on one's pocket, but it should be remembered that the future flock depended to a very great extent on the ram. In that way a farmer should be able to establish a nice little stud, and in time, with careful culling, should have a good flock. An exchange of rams, after a year or two, between farmers could be worked to great advantage. Small paddocks were indispensable to successful sheep farming. The sheep would do twice as well if changed from one paddock to another at short intervals, and the paddocks would grow more feed. There was always a shortage of feed at some part of the year if they carried anything like the stock they could carry in the flush of the season. That could be overcome by a little hand feeding. A stack of straw, a heap of cocky chaff, and a small paddock of kale or other fodder would be found to almost double the carrying capacity of the farm, and a good return should be secured for a small outlay. In that district lambs did not seem to grow well on the native grass, but if kept on land that had been worked, they developed into well-framed sheep. Sheep required access to plenty of water during the summer months. In keeping fallow clean and manuring the soil sheep were a great help. Mr. Olston said that sheep were very valuable for enriching the soil. He had realised 12bush. off a paddock where sheep had been pastured, though the land would not grow a crop before that. He favored the Leicester and Merino cross for that district.

BUTLER, March 26th.—Mr. G. W. Bray read a paper on preparing the land for seed, in which he emphasized the necessity for preparing a good seed bed. The ideal seed bed for wheat was land free from weeds, which had been ploughed up, and so worked down that only the immediate surface was loose and the underlayers well compacted.

CUMMINS, April 7th.—The meeting took the form of a district conference, representatives being present from Yallunda and Yeelanna Branches. Through a misunderstanding no paper had been prepared, but the subject of co-operation was discussed. Mr. Jenkins (Yallunda) said that the Government should co-operate with farmers, especially on the West Coast. Mr. S. Trigg, to show what land in the district would grow when properly cleared and worked, instanced experiments on Mr. F. Lambe's farm, where 100 acres were fallowed with eight horses and a four-furrow plough. Twenty acres were cultivated after every rain (four times). Eighty pounds super., and 55lbs. of wheat were drilled over the whole area of 100 acres. The 20 acres averaged 42bush. to the acre, a total of 840bush. The remaining 80 acres averaged 10bush., or a total of 800bush., so that the 20 acres cultivated yielded 40bush. more than the 80 acres which were not cultivated.

GREEN PATCH, April 2nd.—Discussion took place as to the growing of kale. Mr. C. T. Parker said that Mr. G. Prond had three experimental plots sown respectively with ½lb., ¾lb., and 1lb. of seed per acre, and the last named gave much the best results.

KOONIBBA, March 8th.—A paper on wheat cleaning, in which the relative merits of the power winnower and harvester were compared, was read by the chairman. A lively discussion took place. It was admitted, however, that in a season such as the present one the harvester easily held its own, one man only being required to operate it, whereas at least six men were necessary to work the power winnower successfully. Though three or four might work it, the labor was too severe in good heaps, and it was impossible to sew up the bags. It was admitted that rough ground was not good for harvesters. Ultimately the further reading of the paper and discussion were adjourned until next meeting.

YADNARIE, April 7th.—Discussion took place in regard to the poisoning of foxes, and the opinion was expressed that it was advisable to co-operate and arrange for farmers to lay poison on a certain day to be fixed by the different Branches of the Agricultural Bureau.

EASTERN DISTRICT.

(EAST OF MOUNT LOFTY RANGES.)

BOOKPURNONG EAST.

March 24th.—Present: nine members.

PREPARING SOIL FOR SEEDING.—In order to extract as much from the land as possible at every cropping, every acre cropped should, remarked Mr. A. H. Schulz, in a paper on preparing the soil for seeding, be previously fallowed, because in nine cases out of 10 fallow would produce the heaviest crops. Land for fallow should be ploughed at least 3in. to 4in. deep where the soil was of a heavy nature, and not deeper than 3in. in sandy soil. To save considerable work this should be done before the grass and weeds had seeded. Care should be taken that the soil was well turned over. About a week or so after ploughing it should be well harrowed and then left until weeds appeared. If wet enough it should be scarified or gone over with a skim plough, just as shallow as possible if good work were to be done, and therefore it should never be left until the weeds were deeply rooted, or they would be difficult to destroy. He was averse to cultivating fallow when dry, and would advise turning sheep on to eat off weeds instead of scarifying. Should there be any rain during harvest or at any time before seeding, the fallow could with advantage be harrowed again in order to conserve moisture. Land so prepared would, when seeding time arrived, only need to be scarified or skimmed in shallow fashion before drilling. Time should be given the grass seeds and weeds (if any) to germinate before scarifying or skimming. Since they were not in a position in that district to have all fallow land for cropping, he would also deal with stubble land and new land. In his opinion stubble land should be worked over as soon as possible after burning off in order to secure the benefit of the ashes, and it should not be worked to a greater depth than 2in. That operation should be commenced immediately after harvest in order that the early rains might soak in and make a firm seed bed. In soil of a sandy nature a good scarifier would be sufficient to do the work, but in heavier soil a disk plough would do better work than a share plough, especially if the soil were dry and hard, and it would loosen enough soil to make a good seed bed. Should the surface set too hard for drilling a light cultivator or a set of sharp harrows would loosen sufficient soil to cover the seed. In dealing with new land the best results were obtained by preparing and ploughing it before harvest, and working it on the same principle as fallow land. As most people in that district were unable to do that for lack of time, it was usually left until after harvest. In that case new land should be ploughed as early as possible, and ploughed thoroughly to a depth of at least 3in., and then harrowed several times over to make it firm and even for drilling. It would be advisable to postpone ploughing until after a good rain, in order to enable the plough to do good work. All stumps and roots should be picked off before drilling. It would pay much better to prepare a small area properly than to attempt preparing a large area and finally have to neglect it. The discussion turned on the relative merits of the disk and share plough and the depth of ploughing. The consensus of opinion was in favor of the disk in rubbish. If used properly it would not ridge the ground much, and for general scrub purposes was excellent. About 4in. was the average depth of ploughing recommended. One member said that he fallowed 8in., and reaped 27 bushels, and on a 5in. fallow he reaped 30 bushels.

BOOKPURNONG EAST

April 21st.—Present: 10 members and two visitors.

DEALING WITH INFERIOR WHEAT.—To dispose of inferior wheat, observed Mr. B. Schier, in a paper on the subject of dealing with inferior wheat, means accepting a lower price, which would involve the farmer in loss. It would be far more profitable to use such grain for feeding purposes, if the amount docked were heavy. Feeding pigs and poultry on wheat would show a profit, better than 5s. per bag, at any time. There was always a market for smutty wheat if the grain were good. When cleaning smutty wheat with power winnowers it would be advisable, in order to avoid smutty-tipped wheat, not to pass the tailings over the winnower a second time. In that way the sample would be cleaner, but there would be a heap of stuff to be cleaned up, probably only good for feed, but only a light "dock" would be imposed on the rest. If the dock were 2d. per bushel it would pay to clean it again, when it would probably turn out f.a.q. Barley caused as much, and perhaps

more, trouble in the sale of wheat than smut. It was more difficult to remove barley than smut, because it was just as heavy as the wheat, and would not blow out. Millers did not like barley because of the expense in removing it, and therefore they valued wheat with barley in it at a rate considerably under market price. There was a considerable amount of mouldy wheat during the present season, and mouldy wheat was good only for feeding purposes. A very low price obtained for such wheat, and it would pay farmers better to feed it to pigs or crush it and fatten sheep with it. In the discussion which followed members were in agreement on the following points:—That smutty wheat should not be sown; that seed wheat should be pickled well; that wheat should be removed as quickly as possible after stripping in order to keep the land clean; that rubbish should be kept out of the seed by using a grader, and that mouldy wheat should not be fed to stock, especially when they were pregnant.

MONARTO SOUTH (Average annual rainfall, 14in. to 15in.).

March 31st.—Present: 15 members and three visitors.

SUITABLE LAND FOR SEEDING.—In a paper on suitable land for seeding, Mr. A. P. Braendler observed that the land which grew the best crop in that district should not be cropped oftener than once in three years, and be fallowed and well worked. In winter it should be cultivated, drilled, and harrowed after the rain (not too wet) to obtain the best results. If land, which was not fallowed, was to be put under crop it should be kept as clean as possible with sheep running on it for two or more years. Dry grass, straw, or other rubbish of any kind should not be ploughed in but should be burned off. The cleaner the land the better the crops would be, especially in a dry year.

NEGLECT AND RESULTANT WASTE.—Premising that no nation was more negligent and wasteful than the Australian, and that the worst of them was the farmer, Mr. C. F. Altmann, in a paper on neglect and resultant waste, contended that the number of implements neglected in Australia was beyond understanding. He had seen a stripper with the wearing parts as sound as a bell and the woodwork rotted away. The machine was not worn out, it was wasted. It would have paid that farmer handsomely to buy a few sheets of iron and put up a shed for his machine, even if it were only a small affair, if he could not afford something better. He wondered how many tons of fencing wire were carted about on Australian farm implements. Breakages would not be nearly so numerous if all bolts were screwed up tightly. If one happened to break it should be replaced at once. If no wire were used the majority of ploughs and cultivators would last at least four or five seasons longer. Scraps of iron should never be left to lie about, but should be used for making bolts, etc. Many a good sickle on a binder had been spoiled through a piece of scrap iron. The waste in harness through neglect eclipsed all other. Instead of having breaks properly repaired, a couple of holes were bored and then mended with binder twine. Such contrivances did well for makeshifts, but as a rule the twine was left there, and if worn through a fresh piece was put in. Such harness would wear out, or rather, waste away very quickly, and was always unsightly. On some farms wherever work was finished the chains were dropped and left there until used again on some other implement. Chains would not improve if left on the ground for months. The swings were also left to take care of themselves. As a rule the white ants had the best of them. If kept well painted and housed when not in use they would last infinitely longer. The same applied to tools with wooden handles. If they were put away carefully in a dry place when not in use they would wear out, not waste away. In no case should implements with woodwork be left exposed to the weather. Ploughs, cultivators, &c., need not be housed if they were kept in paint. Steel and iron would not deteriorate if properly painted. All springs and such implements should be kept dry when not in use, or they would weaken very quickly. Many tons of hay had already been wasted because the farmer thought he had plenty of time to put straw on the stack before the wet weather set in, but was caught by a passing thunderstorm and the hay badly damaged. Great waste also occurred through farmers sowing cracked and inferior seed. Instead of properly cleaning their seed they would sow it as long as they could get it through the drill. The consequences were that several feeders failed to distribute the seed, and the crop was uneven. That was especially the case if barley were sown. Instead of seeing that the beards were removed, and it paid very well to do that, the beards were sown and then there were big strips in the crop missing. That was waste of, in many cases, good land.

WYNARKA.

February 17th.—Present: eight members and five visitors.

EXPERIMENTAL PLOTS.—The report on the work at the experimental plots was as follows:—Variety tests (conducted by Mr. Hood)—Bunyip, 11bush. 32lbs.; Florence, 12bush. 11lbs.; Gluyas, 15bush. 5lbs.; Budd's, 17bush. 19lbs. In each case 45lbs. of seed and 60lbs. super. were sown. Conducted by Mr. Richardson—Silver King, 12bush.; Belgian Surprise and New Zealand Blue, each 10bush. In each case 45lbs. of seed and 70lbs. of super were sown. Quantity super. tests (conducted by Mr. Schultz)—Super, 56lbs., yield 14bush. 41lbs.; super. 80lbs., yield 14bush. 55lbs.; super. 112lbs., yield 14bush. 56lbs.; super. 156lbs., yield 14bush. 47lbs. In each case 45lbs. of German Wonder seed were sown. Quantity of seed tests (conducted by Mr. Black)—Federation, 30lbs. sown, yield 10bush. 48lbs.; 45lbs. sown, yield 10bush. 16lbs.; 60lbs. sown, yield 10bush. 57lbs.; 75lbs. sown, yield 9bush. 40lbs. Conducted by Mr. Colton—Silver Baart, 40lbs. sown, yield 14bush. 38lbs.; 50lbs. sown, yield 17bush.; 60lbs. sown, yield 18bush. 38lbs. In each case 60lbs. of super. per acre was used.

CLANFIELD, April 7th.—In a paper on treeplanting Mr. W. A. Hoar emphasized the necessity for some action, if for no other reason than to provide firewood and fencing material in the future. Fruit trees should also be planted in order to avoid paying the exorbitant prices demanded for fruit. All members agreed that something should be done by all farmers in the way of tree planting.

KINGSTON-ON-MURRAY, March 24th.—Mr. S. Sanders read a paper on codlin moth, in which he stated that the pest did not exist in the Murray Valley, and that to keep it free neither apples nor pears nor secondhand fruit cases should be permitted to be brought into the district. When trees were infested they should be sprayed with arsenate of lead, but it was useless for one man to spray if his neighbor neglected to do so, and allowed the pest to flourish.

LAMEROO, March 10th.—Members discussed harvest results, which disclosed both good and bad crops. Takeall had played havoc with some crops, and barley grass had done damage in places. One member reported having used bonedust and super., with the result that he had reaped 37bush. of wheat per acre. In his opinion that was the best class of manure for that district. Mr. A. J. Koch reported the results of two sets of experimental plots, one acre each, for 1916-17. Different brands of super. were used with each set, and were sown with 55lbs. Yandilla King per acre. The yields were as follows:—Plot 1 (40lbs. super.), 20bush. 34lbs. per acre; plot 2 (75lbs. super.), 22bush. 34lbs. per acre; plot 3 (150lbs. super.), 25bush. 58lbs. per acre; plot 4 (40lbs. super.), 22bush. 40lbs. per acre; plot 5 (80lbs. super.), 25bush. 32lbs. per acre; plot 6 (150lbs. super.), 28bush. 10lbs. per acre.

MURRAY BRIDGE, January 30th.—Mr. C. G. Savage (manager of the Blackwood Government Orchard) explained at Mr. Sladdin's orchard, the methods of summer pruning and budding. In the evening Mr. Savage read a paper on drying and preserving fruit for home supplies.

RAMCO, March 12th.—A paper on watering, cultivating, and manuring an orchard was read by Mr. H. Green, and caused considerable discussion, members in the main agreeing with the views expressed. Mr. F. G. Rogers was averse to watering with a full stream at first. If the incline were steep a trickle would be too fast. It was advisable to begin with a small stream and allow it gradually to soak to the end. Then it should be banked up and allowed to flow a few hours longer. Mr. L. Darling said if the land were ploughed 14in. deep as the paper suggested, the water would soak in. In reply to questions Mr. Green said that he preferred the cultivator to the disk, because the latter would run over hard pan. Nitrate of soda was good for fruit trees. For green manure he would plant peas in alternate years, ploughing them in after flowering at the end of August or the beginning of September at the latest.

RAMCO, April 15th.—Discussion took place on pruning the vine, particularly currants. Mr. R. Dunning said that two methods were adopted in that district, cordon and espalier. From his experience, if the vines were exposed to the wind he preferred the cordon system, in which case the side with the wind had twice the growth of the other. Under that system, closer planting could be adopted. He recommended one cordon on the top and one on the bottom wire, and so cover all

trellis. On the advice of an expert he had tried short-arm pruning, and he noticed that the currant bore from the first five or six rods. Near the main arm fruit was poor, the most prolific fruiting being at the top of the vine. By leaving four or five nodes instead of a long arm an abundant crop was produced. He used vine manure for the vines. It had an effect on tonnage, but it was not wise to use too much. It made the berries very large and full of sap, therefore it was better to manure on the light side, because better berries were produced and they were a better color. Mr. F. Lewis said he used the cordon system with one arm, the first vine on the bottom wire and the next on the top, the vines being 12ft. apart. Mr. H. Green remarked that he had seen the T system adopted, and it was the best of all. Mr. L. Darling said that he took the rod and twisted it and found that the vine bore well.

WYNARKA, March 10th.—Members discussed crop returns, which in some respects were very satisfactory, some varieties returning over 15bush. to the acre. Several members reported that the best crops had been produced on land which had been well ploughed, the difference in one case being over 10bush. per acre.

SOUTH AND HILLS DISTRICT.

BLACKWOOD (Average annual rainfall, 27in. to 29in.).

March 19th.—Present: 10 members and one visitor.

ASPARAGUS.—An easily-grown and cheaply maintained plant was asparagus, remarked Mr. L. Porter in a paper on that subject, and to those who relished it the question of its more extensive cultivation was sure to provoke interest. It was admittedly one of the most expensive vegetables on the market, and yet if the cost of cultivation were any criterion it ought to sell at a rate per pound which would be a little more than rhubarb. The main reason that it was only sold in a few shops, and was looked upon somewhat as a luxury, appeared to arise from the fact that, as with other little known vegetables, the public had not acquired a taste for it, nor were they aware of the proper way in which it should be cooked. But why, it might be asked, should the future success of asparagus be hampered, and its day long delayed because of ignorance on the part of housewives? Asparagus was a perennial herbaceous plant of branching habit, and often reached to 5ft. or 6ft. in height, that was, of course, when not cut back. The chief feature about the plant was its large root stock and fleshy roots from which it drew nutriment during the dormant winter period. It was upon the vigor of that root-stock and root system that its value depended, thus enabling it to send up, with the return of warm weather, varying quantities of young sprouts, which really formed the subject of the paper. The "Farmer's Handbook of N.S.W.," from which he had extracted some information regarding its cultivation on a commercial scale, stated that asparagus was extensively used as a vegetable, and he understood that that was a fact so far as New South Wales was concerned. At the Bathurst Experimental Farm the varieties which had proved the best results were Counderer's Colossal and Pride of Brunswick. Market gardeners in the mother State preferred Counderer's Colossal and Palmetto. Generally speaking all the classes of land in Coromandel Valley would grow asparagus, providing it was irrigated. It required plenty of sunshine, and should have a northern aspect. Cultivation might be dealt with under two headings—Kitchen garden and market garden. As to the kitchen garden, he had been very successful with the small patch he had planted, and which he hoped gradually to extend. To establish the bed the seed should be planted as an ordinary cabbage bed would be, but, as asparagus germinated slowly the process was hastened if the seed were soaked in warm water for 24 hours. The seed should be covered not too heavily, but it was safe up to 1in. deep. If the bed had been specially prepared strong plants could be obtained in one year. He left his for two years. Should two year old plants be used those with imperfect flowers which did not bear seeds should be selected, for the reason that seed bearing tended to exhaust the plant. The permanent bed should be trenched to about 24in., and filled up with farmyard manure, old boots, and compost sprinkled liberally with bonedust. The young plants could easily be transplanted if ordinary care were exercised, and the roots were not exposed to the sun or drying winds. The crowns should be kept straight upward and covered with two

or three inches of soil. If blanched asparagus were required—that was white sticks—it was necessary to keep on covering with good rich soil or manure. If green asparagus were desired the heavy top dressing should be omitted. It was well, in any case, in order to keep the bed maintained, to top dress at the end of every winter. A bed so established would last a lifetime, and a patch, say 6ft. x 12 ft. would supply a medium family with ample asparagus right through the growing season. If market gardeners commenced with a kitchen patch and persevered with it; getting their families to acquire a taste for it, and passing some on to their friends, it would help considerably in creating a demand. The experience so obtained would enable them to launch out the better on a commercial scale. In growing for the market, instead of adopting the rather laborious seed bed method, the French plan would prove more economical. The seeds should be sown in the field at once, and the work of planting out saved altogether. The system had been described as follows:—"After the land has been ploughed and cultivated, strike out furrows from 5ft. to 6ft. apart, according to the richness of the soil. The ploughing should be deep—up to 12in. if possible—and it is preferable to plough twice in the one drill, throwing a furrow each way from the centre of the row. Then work a single-horse cultivator (closed up) in the bottom of the furrow to loosen the soil in the bottom of the drills. Make hills 20in. apart in the furrow, mixing the soil of each with a shovelful of well-rotted fine manure. Sow four or five seeds in each hill, and cover lightly with good soil. The hills should then be watered and kept moist until germination, which will take about three or four weeks. After germination the plants should be thinned out, leaving only the strongest plant in each hill. Keep the soil loose and free from weeds, and, as the plants grow, well-rotted manure and soil are applied, a few inches at a time, round each. The filling up goes on steadily, care being taken not to choke the plants until the drills are filled. The after treatment consists in keeping the land free from weeds, and, in the case of a large field, frequently cultivating to conserve moisture. When the stems turn brown they are cut away, and this allows the easy application of manure during winter. Asparagus, to be profitable, should be forced, and quick-growing succulent shoots should be aimed at. Old established roots could be cut for about 10 weeks before being allowed to run up to stem and leaf. The small, as well as the marketable shoots should be cut clean away; otherwise they exhausted the roots and reduced the output. If blanched asparagus were required it should be cut as soon as the tops showed about ground, and about 8in. or 9in. below the surface. For green asparagus the shoots should be cut when about 7in. high, cutting 2in. below the surface. To secure a stick half white and half green the shoot should be cut when about 4in. high, and about the same distance below the surface. In New South Wales green asparagus was most popular, probably because if grown quickly, the green shoots were more tender and had not developed the stringy outside shell which was generally found on the bottom end of the white shoots. In the Goulburn district the growing of that crop had proved a profitable sideline to orcharding. The asparagus was planted in single rows midway between the rows of trees and the beds were now a few feet wide. As an instance of the lasting qualities of the crop it was stated that at Goulburn there was a small bed, still bearing heavily, which was established when the property was taken over by the present owner in 1868. That made the bed now 48 years old at least. The weight of a bundle of asparagus, as sold in South Australia, varied from 12oz. to 16oz., and the price to the grower over a season averaged 6d. per bundle. At the commencement of the season it realised 1s. wholesale. One grower near Adelaide would never accept less than 8d., and a very large retail dealer in asparagus stated that that grower was able to take his stand for the reasons that he was practically the only one who produced green asparagus; and also that the supply available in Adelaide did not meet the demand throughout a season. As far as could be ascertained the growing of asparagus in South Australia was confined to a few gardens along the valley of the Torrens, at Hectorville, and the Reedbeds.

EQUALISING FRUIT CROPS.—In a paper on this subject Mr. W. Turner said that in South Australia they had an overflowing apple crop one year and the following season not enough for their own requirements. Thus the export trade they had was totally lost during those off years, and had to be worked up again for the next big crop. It seemed to him as if the orchardists could do something in the way of pruning or thinning when they had a big crop to cause the trees to carry a more regular crop every season. It would be a great benefit to themselves as well

as the State. Tasmania seemed to have more equal crops than South Australia, and never seemed to miss exporting. Perhaps climatic conditions had something to do with it, or it might be the varieties of apples they grew, as some varieties cropped more regularly than others. The Cleopatra, for instance, appeared to be South Australia's most regular cropper, but in some districts that year it had been a total failure. He believed that "black spot" had something to do with that during the present season. They had had a very wet season, and spraying had been somewhat neglected. Dunn's Seedling was about the most irregular cropper in South Australia. They had an overflowing crop one year and not an apple the following season, but they had been slightly neglected as regards pruning. Jonathan trees, which had been growing very strongly, and were summer pruned last year had a nice setting of fruit during the present season. He believed that summer pruning and thinning out of the fruit when they had a big crop would do something towards a more regular yield.

BLACKHEATH.

April 6th.—Present: 10 members and five visitors.

BEST WHEAT FOR THE DISTRICT.—The best wheat to grow in that district was Federation, but not for hay, remarked Mr. H. Pym in a paper dealing with that question, and also the pickling of wheat. There were a number of other kinds or varieties which were better for hay. Federation was short and strong in growth, and did not shake out with the wind and stormy weather. It stooled out well, and did not require more than 40lbs. to 50lbs. per acre for seed. It should be sown on good, heavy soil, and not before the second week in May. Farmers should avoid sowing Federation on loose sandy soil because it was liable to be attacked by take-all. Every farmer who had land suitable for growing Federation should sow a portion of his paddock with it, because when ripe it could be reaped at any time as long as it was not wet. It was very easily thrashed. It weighed a little on the light side, but it made up all the difference in the number of bags it filled. There were many other varieties of wheat throughout the State that had not yet been tried, but at present he recommended Federation for growing grain and Purple Straw, Bluey, and Marshall's for hay purposes. Those three wheats were slow in growing and they stood more wet than early varieties. Now, when bluestone was ruling at such high prices the best plan for pickling was to use a tank or a barrel to dip the wheat into. The wheat should be completely immersed, but should not soak for more than a few minutes. About 1lb. of bluestone should be used to every 7galls. of water. If the seed wheat had smut balls in it it should be sold, and fresh clean seed used. The farmer who sowed smutty grain would reap smutty grain. Members generally agreed that Federation was best for grain, and Bluey best for hay in that district. It was also agreed that bluestone was a preventive, not a cure, for smut, and that 1lb. of bluestone to 10galls. was a sufficiently strong mixture.

CYGNET RIVER.

April 5th.—Present: five members.

CARE OF FARM HARNESS.—Mr. C. F. Miller read a paper on the care of the farm harness in which he pointed out that owing to the frequent rains on Kangaroo Island special care should be taken of harness. In the first place only the best harness should be purchased, because, though it cost a trifle more in the first outlay, it was cheapest in the long run. Twice a year the harness should be given a dressing of 4oz. of lamp black to 1gall. of neatsfoot oil. The harness should be thoroughly cleaned with hot water and soft soap and thoroughly dried before the dressing was applied. A few awl blades, a patent awl hait, half a dozen saddle blunts, a ball of hemp, and a lump of beeswax should be on every farm. A clamp to hold the work could be made of two cask staves screwed together at one end and fitted to come in close contact at the other. By stitching, a stronger job was effected than with copper rivets, and it looked much better. He was averse to soaking new collars for horses in water before using, because it was unnecessary, and had a tendency to cause the straw to rot. A collar should be bought to fit. No matter how hard a collar might become it would not hurt the shoulders if they were thoroughly groomed before the collar was adjusted. Every farmer should be able to line and stuff his horses' collars. That might seem difficult, but it was very simple by the use of a little collar check and a small quantity of curled horsehair. The check would be purchased, but the horsehair might be obtained by saving the hair pulled

from the horses' tails. To curl horsehair it should be thoroughly washed, and whilst still wet, twisted into a rope with the aid of a carpenter's brace. Then the rope of hair should be boiled for half an hour and dried. Afterwards it should be put into a camp oven and baked with a slow fire, care being taken not to burn it. Many advocated a separate room for harness, but he preferred to hang each horse's harness at the head of the stall because it expedited harnessing and unharnessing. If the stable were kept clean, and disinfectant freely used the harness would not deteriorate.

INMAN VALLEY (Average annual rainfall, 26in. to 27in.).

April 5th.—Present: seven members and two visitors.

MAKING THE MOST OF A SMALL HOLDING.—Mr. A. Lovelock read a paper setting forth the method of working a small holding to the greatest advantage. He divided the subject into two classes—(1) holdings from 80 to 150 acres in extent, and (2) holdings of from 20 to 80 acres. In either case it was essential that the holder should determine what particular line he intended to adopt to make his land keep him and his family and then put his whole mind and strength into the work without weakening or attempting to change his purpose, until absolutely assured that he was on the wrong track. All the time spent in trying new ways and experiments on the block was generally speaking valuable time wasted, and the owner was not any further ahead than when he first took over the holding. Blocks of the first class, that was 80 to 150 acres, in that district, should be worked as dairy and fowl farms; the owners growing only sufficient for the requirements of their own stock—that was to say, enough hay, corn, and green stuff for the stock on their holdings during the 12 months. The cows, if carefully selected, should average £14 per head per year in butter alone, taking the rates prevailing for the last three years. He would then still have the separated milk for his calves, pigs, and fowls. The calves should all be marketed as soon as ready, and not saved to rear except in the cases of heifer calves from specially good milkers, because the feed which the calves consumed would keep another, or perhaps two extra, cows. He should rear his own pigs by keeping two or more good breeding sows. The litters of those sows should be marketed when they would dress between 80lbs. and 100lbs., because pigs of those weights always realised a good price, and did not require a large amount of food to make them marketable. They were not long in the sties, and so gave a quick return. Then 100 or more fowls should be kept. It was advisable to have both the heavy and light strains. In the fowlyards almond trees should be planted, because they afforded shelter for the fowls, and soon came into bearing. The almonds, when picked, added considerably to the returns of the farm. In the second class of blocks, those from 20 to 80 acres, the land would be best utilised in apple and currant growing. The holders should be careful to plant only the very best of export apples, and only enough trees of the stone fruits, such as plums, peaches, apricots, &c., to supply the demands of the community within easy reach of his garden. The currant vines should be planted on the poorest parts of his holding. They would soon grow and bear, and there was always a good market for that produce. He knew an instance where eight acres of currant vines in the third year produced over £100 worth of currants.

KANMANTOO (Average annual rainfall, 17.90in.).

April 7th.—Present: seven members.

PROCURING AND PROTECTING FARM IMPLEMENTS.—The success of a farmer, declared Mr. R. G. Critchley in a paper on procuring and protecting farm implements, depended largely upon his knowledge in selecting, and his care in protecting his implements. A farmer should use his own judgment to decide which machine or implement he required, and he should select an implement from what he had seen of it, and not on what he had heard of it. An implement successful on one class of land was not always just what it should be on another. For the protection of implements it was well to keep them under cover, because exposure to the weather had a very bad effect. If implements constructed of steel were left out in the weather the paint chipped off, and the iron or steel rusted. The nuts would become tight and the threads rust off. Having finished working a machine, all the accumulated dirt and grease should be removed and a note taken of all necessary

repairs. All implements, both wood and iron, should be painted before they were taken out for use. That would not only make the implement look like new, but would give it a much longer life. Painting was especially necessary for the harvester, because a good deal of light wood was used in its construction, and unless painted frequently the weather would cause the wood to swell and warp.

LONGWOOD (Average annual rainfall, 37in. to 38in.).

April 7th.—Present: nine members.

ORCHARD AND ORCHARD WORK.—The concluding portion of Mr. C. H. Beaumont's paper on this subject was as follows:—"Having planted the trees, the main object of the orchardist is to get good and quick growth on all of them. The principal factor in obtaining this is good and thorough cultivation. Cultivation means freedom from weeds and set ground. After planting, during the first season, the implement known as the orchard cultivator is one which should be often in use. Keep the soil loose, and especially go over it after wet days. It is an advantage to work the land first one way and then cross the work, but if this is not easy to manage, the work may be done by crossing in and out through the trees, cutting the figure eight, so to speak. This will not leave very much for the hand hoe. Care should be exercised, when working up to the trees, not to damage the butt or to pull up the roots. Ploughing is the main operation for the winter. It is advisable to do the first ploughing as soon as the ground is fit. I like to plough up to the trees with a single plough for five or six rounds and then complete with a double-furrow plough. The depth near the trees should be 3in. to 4in., and the remainder 5in. to 6in., varying the depth each year. Leave the first ploughing in the rough or clod. Towards the end of winter, or in the early spring, plough away from the trees and level the soil again and thoroughly work with harrows to fine tilth, and thereafter with the cultivator. I do not intend to go into the question of the best make of implements to use in the garden, but would suggest that the disk implements answer most of the requirements. It is beyond the scope of this paper to enlarge on matters of spraying and pruning, suffice it to say that every grower knows that to get good clean trees and fruit he must make use of the spray pump and the various preventives or remedies which have been proved to be the most efficient. We must know first of all why we are spraying, and then use the spray at the right time. If it is to prevent a fungus disease, such as 'black spot,' 'shot hole,' or 'curl leaf,' then the only sprays worth considering are those compounded with bluestone such as Bordeaux mixture and Burgundy mixture, and the time to use them is before the opening of the buds and again when the leaves are starting to fall. Insect pests must be dealt with when observed or when known to be about, and the remedy is either the use of poison or some sticky or penetrating material. For codlin moth the compound known as arsenate of lead has no equal, and the powder form is the most convenient. The time to use it is just as the fruit is formed, or when the petals of the blossoms fall. The second spraying should be given about 10 days later as a greater safeguard. Later sprayings will be necessary for the late sorts of pip fruits, in fact a coat of spray should be always on the fruit. For red spider the main object is to destroy the eggs, and this may be done to a great extent by using red oil emulsion in the winter. If it becomes necessary to combat the insect or 'mite' itself at blossoming time, then use an emulsion composed of lime and sulphur, and this will kill the mites, without interfering with the blossoms if carried out in the early morning or during a cloudy day. For sucking insects such as the orange or peach aphis or the woolly blight, rosin wash and tobacco water will be found the most effective. For woolly aphis it is necessary to hold the nozzle close in to disturb the insects. For a bad tree try pure kerosine, rubbing it on with a paint brush, follow up the treatment every few days and a great improvement will result. All of these materials can be bought ready for use made in Adelaide, and can be recommended as genuine, but if the orchardist prefers to make up the compounds himself he may obtain a pamphlet giving instructions at the Department Office, Exhibition Buildings, Adelaide. No orchardist should try to go on without spraying—it is really an insurance. Some years are sure to be different from others, and so disease varies, but the man who sprays properly is ready. Considerable perseverance is necessary in years like the one now past, but it is not often that the weather plays such pranks and spoils our work. The pruning branch of the work of the orchardist is one of the most important, and is also one on which opinions differ very much. The end in view is the same—to make, firstly, a fine strong well-shaped tree, and then to make it bear a lot of good fruit. To shape the tree must be the work of the first few years in

the orchard. Fruit is not then required. Get three good main branches for a start, and the following year double the number, and so on. The quantity to cut out will depend on the tree and the sort, but make them strong. Trees which have made long growth do not require cutting back so heavily, in proportion, as the weaker ones. The pruning of young growing trees should be done during the winter. If any of the trees have been severely damaged by hares or by implements it is better to take them out at once and replace them, as they will only make dwarfed, unprofitable trees. When it comes to pruning for fruit then it will be necessary to study the variety. Some bear on the main limbs, others on laterals; some do better with winter pruning and others with summer pruning, but as a general rule it will be found that a tree in bearing does not require very much pruning. Mr. Quinn's book on the pruning of fruit trees and vines may be obtained from the Department or from seedsmen. It is so well illustrated that it is really a practical demonstration on this branch of the work of the orchardist, and no grower should be without a copy. I have heard some men say that pruning is all rot, 'Why not let Nature take its course,' they say. Well, have you seen it tried? I have, often; and I have noticed that Nature deals more severely than the pruner does. We should remember that Nature's way is to bear fruit as quickly as possible, reproduce itself, and then probably die. The quality of the fruit is not to be considered, and that is why we have to wage a continual warfare against Nature if the trees are to produce what we want. The finer and more delicate the variety the more difficult it is to produce. I had intended going somewhat extensively into the marketing of fruit. It has always appeared to me that the present method of marketing is very one sided. The grower gets about 10 per cent. of the price paid by the consumer. This should not be. There is now on foot a movement for co-operation amongst fruit growers, apple growers particularly. The general idea is to establish centres for receiving the fruit, to grade by machine graders, to pack and export higher grades, to pack and store grades for the local market, and to use any marked fruit for drying or evaporating, or else to pulp it and pack for sale in large tins, and to make cider or vinegar of the refuse crops, &c. There is no doubt that the handling in bulk, such as suggested, must benefit the producer, and there is no reason why all fruits should not be dealt with by the system of co-operation." A unanimous vote of thanks was accorded Mr. Beaumont, this being the last of his papers for a time. His earnest desire to be of service to us has won our respect. We esteem him because he enjoys his work, and comes to our gardens as an inspector who is happier if he can teach us something. His papers have been instructive, and have been a medium of disseminating much knowledge.

MACGILLIVRAY (Average annual rainfall, 19in. to 20in.).

April 3rd.—Present: six members and one visitor.

AGRICULTURAL DEVELOPMENT AND EXTENSION ON KANGAROO ISLAND.—To all who were interested in the prosperity of Kangaroo Island the problem of advancing on sound lines its agricultural resources was by no means a matter of indifference, premised Mr. H. C. Williams in a paper on agricultural development and extension on Kangaroo Island. He continued by observing that the present area under cultivation constituted a mere fraction of the whole, and sustained a proportionately small community, which was too sparse to be self-contained. The isolation from the mainland, though but a matter of a few miles, was one of the strongest reasons why the lack of numbers was a serious drawback to present settlers. With a larger population not only would cheaper transport be assured, but internal conditions, both economic and social, would improve accordingly. Progress was feasible, but it was important to warn newcomers against exuberant confidence and rash undertakings. They should husband their capital until they had adjusted their notions of farming with the actual requirements in their new sphere. Agricultural development applied more particularly to existing farms. On those varied cropping could be practised with the object of carrying more livestock, and raising the yield per acre. A few acres of rape, kale, turnips, mangolds, lucerne, peas, or other forage crops, properly grown, would make a small farm much bigger, as results went, than its area under a bare fallow-cereal-grazing system would indicate. A few points he wished to emphasise were (1) Thorough preparation of land for most of the above-named crops; (2) testing for germination of all doubtful quality seed; (3) liberal manuring; (4) planting mangolds in rows to allow of horse-hoeing or scuf-

fling with a Planet Junior; and (5) judicious rotation. Agricultural extension, whether for cereals or other field products and by-products, was for the present confined within a radius of 20 miles or so of existing ports. If all the payable country within such a comparatively small location were cleared and worked to the best advantage the settlement of the remainder of the island would, by degrees find its own level, and command adequate transit facilities. The fine climate, good rainfall, and complete freedom from such pests as rabbits, foxes, and dingoes were grounds for optimism on that point. Land which had been abandoned only a few years ago by practical mainlanders was now changing hands at £6 per acre. Better methods were in vogue now than was the case then; and still better methods and discoveries were just as likely to follow. New settlers needed to discriminate between prospectively payable country and the other class. If it were already cleared the task was not a difficult one to a man of experience and observation. But as most of the available land was virgin scrub there was more call on the ability to classify it in regard to its fertility or sterility. Mallee, apart from excessive limestone, could be taken to be a token of good soil. Narrow leaf, lavender, varieties of ti-tree on dry levels, gums, and strong growths of broom brush all favored the better soils. Wet areas carried bottlebrush, gums, paper bark, ti-tree, or otherwise proclaimed themselves. A section might contain good and bad land in mingled areas. If so it would be more profitable to open up the best of it first, even though such a course put the paddocks a mile apart. The commencement was weal or woe to the average selector. In other words, a fair return on the initial expense of cropping was more to the purpose than seeing an uninterrupted clearing which largely consisted of third-class land. New land should be fallowed the first year if possible, unless there had been a dense growth of scrub burned off it. Mouldboard ploughs with no draught on would dislodge more stumps than the disk implements. The depth of ploughing to commence with need only be sufficient to cut and turn the furrows. Free use of harrows was to be recommended to pulverise the soil, and extract stumps. On light soils, until the stumps had been well thinned out, the harrows would act as a substitute for the land roller in firming the seed bed. Crops to begin with on new land had to be decided upon with due regard to the experiments of older settlers. On fallow land of fair quality there should be no failure with wheat if the seed were from good crops grown in the locality. Considering that barley was so much grown, and such heavy yields obtained, it seemed that, when wheat was to be grown a variety approximating barley in several features would give the best results. Two characteristics from that viewpoint were a short growing period and easy thrashing. Wheats which were known as "early" sorts and easy to thrash, would do according to that theory. Walker's Early was being grown in MacGillivray, and was yielding very well. The term "early" differed in meaning from the ordinary use of the word, and it should be noted by non-wheatgrowers and learners. Early wheats were sown later than "late" varieties of wheat elsewhere. For Walker's Early, the time of sowing in that district was June and July, whereas a "late" variety would be sown not later than the middle of June. Oats were preferable to barley for a first and second crop when wheat was not grown, because they stood higher for reaping over the trash usually present on new paddocks as well as sweetening the soil, and furnishing a lot of straw, which was always worth having amongst the sheets. When a stubble burn was not obtainable recourse should be made to the harrows or something similar to drag the burning straw over the paddock; working with the fire going to leeward of the straw was the usual way. With reasonably clear land, until weeds became too numerous there should be no trouble to work on a system of bare fallow-wheat-oats-barley and grazing. A few acres near the homestead could be thoroughly worked up and subdivided into two or three acre lots, and used for such crops as early green feed (of which Cape barley was one of the best), mangolds, swedes, turnips, rape, lucerne, kale, potatoes, or anything similar that would ease the haystack, besides furnishing the means of growing bacon, eggs, and butter. As the farm became free of shoots, attention could be given to, first, cattle, and then, with more grass land available and safe fences, the keeping of sheep. At that stage the carrying capacity of the farm was more to the outback settler than the number of bags he could grow, and that brought him to the practice of agricultural development. In regard to manuring, though bone manures were beneficial the cheaper 36/38 mineral super. would give a quick return if sown at the rate of 120lbs. per acre. On special plots, like early greenfeed that possibly would have to stand a deal of feeding off and then be saved for reaping, an application of 2cwts. was a safe investment. Bone super. contained a little nitrogen, which would produce a

taller growth than mineral fertiliser alone, therefore its use might be warranted where the best hay crop was required. Bonedust was more suitable for land under intense cultivation, and on orchard or lucerne lots. Top dressing growing crops with nitrogenous fertilisers such as ammonia and soda was a matter for careful experiment, so that the benefits might be compared with the cost. Farmyard manure was good in the right place if it were ploughed in and firmed well, should that be necessary. Perhaps one of the best uses for it was on a patch of early green feed, to be followed by a root crop. Ironstone country might be payable under correct treatment. First there was the question what was ironstone country? Much of it answered for itself by its pebbles of brownish hue and general aspect of inhospitality. Other so-called was not ironstone, but sandstone of similar color. That was not at all to be despised. The real ironstone apparently suffered from bad drainage as well as want of humus. The impervious subsoil was very near the surface, and did not absorb the heavy rains quickly enough to avert water-logging, with the result that the air necessary to sustain cereal crops was driven out. Consequently crops which looked pretty well at the start were suffocated when the rainy season set in. Two remedies suggested themselves—(1) Ploughing the paddocks in narrow strips with the fall of the land; and (2) bringing the subsoil up a little at each successive ploughing, thus deepening the top rooting soil. Actual subsoiling might be undertaken when stumps and other obstacles had been removed. Open drains for practical purposes would need to be cheaply made to interest a beginner. Supplying humus was the next necessity. It was quite possible of accomplishment by growing and turning in green crops of course, but again the settler had to stick to a schedule of ways and means. About the only thing for it was to return all the stubbles to the soil, supplemented by a few acres of rape from time to time. From the nature of ironstone soils to dry out hard on the surface, due presumably to the brace of defects above discussed, there was call for more than ordinary discretion in working on them with harrows and roller. A rough surface would better counteract the tendency to set than would one which had been smoothed down and consolidated by the two tools just named. That would be most noticeable during autumn and winter sowing. Lime might prove a factor in reclaiming the land of ironstone formation, and if so the material was boundless and close at hand. Meantime, with so much superior land on the island there was no need for any farmer to battle with the inferior ironstone as a primary undertaking. In the discussion which ensued members were averse to fallowing new ground, considering it most advisable to have a crop the first year. It was also agreed that sheep instead of cattle should be kept as soon as feed was available.

MOUNT BARKER (Average annual rainfall, 30.93in.).

March 7th.—Present: 51 members.

MECHANICAL DEVICES ON THE FARM.—Each farmer must decide for himself how much purely mechanical work it will pay him to do on a farm, remarked Mr. B. Stephenson in a paper dealing with mechanical devices on a farm. In thickly settled districts it might be cheaper for the farmer to purchase most things, which he did not grow, but, in scattered localities the farmer should know how to effect simple repairs. If skilled labor were available it would be cheaper to hire mechanics for all important repairs, but every farmer should have simple tools and a workshop where many needed mendings and changes might be effected. All tools should be sharp, and for that purpose the file, grindstone, and whetstone should be kept handy. The method of sharpening tools could only be acquired by practice. In filing the cutting should be done by a motion away from the operator. In filing and setting saws the saw should be set firmly and truly in a clamp. A very good steel punch could be made by cutting off the tine of an old pitchfork. A forked branch of a tree could be used as a makeshift for a stone boat. Heavy stones could be rolled on to the fork and pulled by a horse. The same contrivance would be found useful in transporting many cumbersome articles a short distance. The wheels of an old mower could be used in a handy truck which would carry a reasonable weight. A handy knife for skinning a beast or sticking a pig could be made from a discarded pair of sheep shears, and a good chopper could be improvised by putting a handle on an old chaffcutter knife. A piece of old rubber hose drawn over the chains would prevent chafing on the sides of the fat mare when ploughing. Lorry traces made from hoop iron gave every satisfaction. A useful paintbrush

might be made by passing a fine wire around the centre of several strands of horse hair and then pulling them through a piece of hose. The hose would act as a handle, and the projecting horsehair could be trimmed into shape with a pair of shears. A good land leveller to provide a smooth, even surface might be made of four pieces of 8ft. long 4in. x 4in. hardwood scantling, pinned together 16in. apart, and so braced that each piece would be firmly held. The front lower edge of the first and third pieces of scantling should be rounded in order that they would slip over the soil, but the second and fourth pieces should be left with sharp edges. The operator would ride on a plank thrown across the top, changing his position when necessary to make the leveller run straightly. With that implement, a sharp harrow and the soil grinder, a field might be put in condition for almost any crop. A handy garden roller might be made by filling a carbide tin with concrete, a piece of piping being run through the centre (with ends projecting some inches) before the concrete was put in, to afford a purchase for tackle or a handle to draw it. A good whitewash could be made as follows:—Fresh lime six parts, coarse salt two parts, alum one part. Dissolve the alum and salt in boiling water, slake the lime, and mix all together. Pass through a sieve to eliminate the lumps. The mixture should be of the consistency of ordinary paint, but if too thick water might be added. Three coats of that wash should be applied, allowing one day between each. It would remain good for some years. A cheap inside paint might be made from 8oz. freshly slaked lime mixed in an earthenware vessel with three quarts of sweet skimmed milk. In another vessel mix 4½lbs. of Paris white with three pints of skim milk. When these mixtures had been well stirred they should be mixed together and 6ozs. of linseed oil added. Mixed well the paint was then ready for use. A good glue could be made by soaking isinglass in spirits of wine and brandy for 24 hours. When open and mollified, the ingredients should be boiled together and kept stirred until well mixed. When a drop of it cooled, turned to a strong jelly, it should be strained through a linen cloth into a vessel to be kept closely stoppered. A gentle heat would dissolve the glue. A paintbrush which had become clogged might be restored by boiling in vinegar.

How to Solder.—A paper describing the process of soldering was read by Mr. W. E. Daddow, who said that the requisite tools comprised the following:—Soldering iron, file, salammoniac, spirits of salts, solder and brush. The soldering iron should taper to a point, and have smooth sides. When the iron was in good form it should be tinned. To do that it should be filed until it showed a clean copper face. If it changed color after filing it was too hot, and should be left to cool somewhat. The iron should then be rubbed on the salammoniac, some solder being melted on the iron whilst that was being done. If the iron were the right temperature it would become a bright silver color. After tinning the iron should not be heated too much or it would require tinning again. Good solder was never devoid of brightness on the side which did not touch the mould, unless it was of special quality, and then it would be white to cream in color. Solder which had a frosty appearance on the exposed side from end to end without any brightness was not good. It must have some part clean and bright. To test spirits of salts, if the fumes were inhaled by a deep breath without inconvenience, it was too dilute. In soldering galvanized iron the spirits of salts should be used full strength. Anything which contained zinc required the spirits in the raw state, but articles which contained no zinc required an addition of zinc to the spirits of salts, making what was known as killed spirits. In soldering tin plate either killed spirit or sperm candle might be used as a flux. In treating copper or brass killed spirits were best. For silverware resin or killed spirits should be used, but unless skilled in the art of soldering, silverware should not be touched, because silverware melted at so low a temperature that the soldering iron was likely to go through the metal. Killed spirits should be used for all malleable iron, but cast iron could not be soldered at all. Spirits should only be used on galvanized iron in the spots to be soldered because it corroded the iron. A good horsehair brush and a damp cloth were necessary in repair work, the former to apply the spirits, and the latter for wiping off. That operation, if performed two or three times before commencing to solder would result in better work. It was a mistake to use too much solder, but if the parts were clean and bright, and the right flux used, the soldering would be easily done. It was not practicable to solder over rust, nor would solder stick on a dirty surface. Salammoniac should only be used to tin the soldering iron, or to put in water in which the iron was dipped to clean it.

whether it would pay well at the present price of chaff to handfeed sheep, but, in his opinion it would pay better than selling it. If sheep were being kept to top up or fatten, while waiting for the fodder to grow, they should be fed on chaff, and when the green feed was ready they would require very little before they would be ready for market. Mr. E. E. Morrison had once fed some sheep from the screenings of the elevators in Canada, and they had done very well. He used a self-feeder and it did not kill any sheep. In feeding oats to sheep they should not be given too much at first. Mr. G. Wittey considered that crushed oats were the best for sheep. Mr. C. S. McLean said that chaff fed in a self-feeder in Victoria was successful. One of the best things for a man on a small holding was to handfeed sheep, especially if the market were slack. Mr. W. A. Aslin said that enough salt was not used for stock, especially at the present time of year. In answer to questions Mr. Gust said that he had tried feeding oats to sheep, but a few had died and he stopped it. He had about 600 sheep, and gave them six bags of chaff twice a day. Feeding with chaff would, he thought, do instead of change of pasture, and it would give the pasture a chance to freshen up.

NARACOORTE (Average annual rainfall, 22.60in.).

March 10th.—Present: 25 members.

ARTIFICIAL FERTILISERS ON THE FARM.—Mr. S. H. Schinckel read a paper on artificial fertilisers for the farm; what to use, and how to use it. Of all the artificial fertilisers, he said, phosphoric acid was of the greatest importance, and then followed nitrogen and potash. Superphosphate was prepared by the action of sulphuric acid when using stones, bones, &c., for treatment. It was quite safe to say that superphosphate had given very good results on all agricultural land, particularly in the increased production of wheat. That had been done by using, on an average, about 60lbs. to 70lbs. per acre. Could they improve on that? That was a question every farmer should answer for himself, and all could do it by a little experimenting. From personal experience and observation he had found that 1cwt. of top grade super. per acre gave the best direct monetary returns, but he was also strongly of opinion that if farmers generally used 1½cwts. per acre that the extra cost would indirectly prove to be a very good investment, not because there would be a direct gain in the crop, but because of the marked improvement in the pasture that would follow. That was particularly noticeable in the increase of the clover family. They in turn added nitrogen to the soil, and further, the carrying capacity of the land was improved, more humus was supplied through herbage and droppings of stock, and when the land was again required for a cereal crop it should (other things being equal) be found in a better state of fertility. Some farmers considered that 1½cwts. per acre would be detrimental to wheat crops, but they must not forget that they were favored with a good rainfall, and phosphates were not leached out of the soil through excessive moisture, but were only taken from the soil by or through the growth of plants. What were the best phosphates? There were various brands, and every farmer had his own fancy. Personally he had failed to find much difference, so long as the phosphates contained the given quantity of phosphoric acid. But if the phosphates being used contained a fairly high percentage of sulphuric acid, they should be used early in the season—that was before the wet weather set in, otherwise the damp atmosphere acted on the sulphuric acid, and the super. when put into the drill, would very quickly become damp and difficult to handle, and cause a big strain on the works of the drill. Sulphuric acid did not in any other way interfere with the value of superphosphate. Nitrogen was a fertiliser which could be supplied to the soil through humus, leguminous plants or nitrate of soda. If the latter were used it should be used with care. Nitrogen, if used to excess, would cause rank and strong growth of flag and stem. Sometimes in wet winters the crops on the lower lying grounds turned yellow. That was generally an indication that there was a deficiency of nitrogen. In such cases a top dressing of ½cwt. of nitrate of soda would generally give satisfactory results for a hay crop, but any excess of nitrogen might seriously affect the quality of it, causing too much growth in flag and stem at the sacrifice of grain. Potash as a fertiliser by itself was seldom used in that district, their agricultural lands, generally speaking, being fairly well supplied with it. It should, however, be found useful for some of the root crops and stone fruits. Lime was deficient in many of their soils. He could not claim that he had had any great benefits from its use, but he believed the time would come when they would find the lining of

their soils to be a profitable undertaking. Lime was slow in action in the soil. In other parts of the world farmers regarded the liming of soils as one of first importance. Other valuable fertilisers were guano super., very useful, though not largely used in that district. Guano was the deposits of sea birds, and contained nearly all the ingredients of plant foods in certain quantities. It had given fairly satisfactory results when used. It also left a good effect upon the pasture. Bone super. had a more lasting effect upon the soil than superphosphate, but was not so quick in action. Artificial fertilisers were also very useful in the vegetable garden, but if farmers would take care of their farmyard manure there would be no need to worry about artificial manure for the garden. Mr. W. Loller said that superphosphates had proved of most benefit to the poorer soils, and thousands of acres of country had been cultivated which would not have been cultivated if it had not been for superphosphates. It was a great mistake to use lower grade manures, for the transit of them cost as much as the higher grades. It paid farmers to get the best manures. If they thought they were too strong for their land they could break them down with sand or some other ingredients, or use less per acre. It was to be regretted that so many farmers threw away a lot of manure. They should gather the manure and heap it up, place a layer of gypsum on it, then a layer of manure, and another layer of earth, and so on, and they would be surprised at the quantity of good manure they could get together. Mr. Alcock said the great advantage in using artificial fertilisers was to be seen in the lighter soils and in the dry districts of the State. It was marvellous the results that had been obtained from phosphatic manures in the lighter soils, and he need only refer to the Pinnaroo district, which had brought forth splendid crops of wheat with a remarkably low rainfall.

KALANGADOO, March 10th.—Mr. A. J. Haines read a short paper on feeding the dairy cow, which caused considerable discussion. Mr. M. Rogers said that he found Japanese millet a fine summer feed for cows. They were very fond of it, and did well on it. He sowed it in December.

KYBYBOLITE, March 29th.—Mr. W. J. Spafford (Superintendent of Experimental Work) delivered an address on tillage operations, dealing mainly with ploughing, formation of the seed bed, water conservation, tillage of the land in general, and practical methods pertaining thereto. An interesting discussion ensued.

MOUNT GAMBIER, March 10th.—The Hon. J. Botterill initiated a discussion on bush fires, and the best means of handling and preventing them. When a fire broke out the best course was to get to the front of it and ascertain whether it were possible to prevent it going too far. If that were impossible the only course was to work up from the back. It was important to get as many men as were available to assist at the earliest moment. In heading a fire it was best to take advantage of some well used road and work back. It was a mistake for those engaged in suppressing a fire to work so hard that they were soon knocked out. In special times, if a house or stack were in danger, of course great efforts should be made, but the best way was to go on steadily and not overdo it. That was a point always to be borne in mind. The movement among the district councils to take up the formation of country fire brigades was a very wise one. Another important factor in extinguishing bush fires was the provision of water carts. They could do a tremendous amount of work with a little water, over a mile of fire having been put out with 200galls.atMoorak. A few beaters should be provided. With a properly made beater a man could work at a fire for hours without being exhausted. Mr. E. F. Crouch said that under the District Councils Act a council could appoint 10 people in different parts of the district to look after and supervise the beating out of bush fires, and it had also the right to spend any reasonable sums in equipping those people. Mr. H. G. Wheeler said that a man with a proper fire beater could do as much as five or six men equipped with boughs of trees and bags. Mr. Crouch condemned the two-wheeled water cart. They should have a four-wheeled wagonette or a German wagon.

MUNDALLA, March 14th.—Mr. A. H. Ormsby read a paper on preparing for seeding, in which he recommended that immediately after harvest the seed wheat should be cleaned ready for pickling. The implements should be overhauled. The best varieties of wheat to sow in that district were Federation, Silver King, and

Yandilla King. As soon as the first rains fell about three-fourths of the wheat which it was intended to sow should be pickled, because that gave the seed time to dry well before sowing, and the probabilities of smut were minimised. About nine days after the rain, when the weeds had begun to show, the cultivator should be put upon the fallow about one day in advance of the drill. The drill should be kept close to the cultivator, because in case of rain it saved going over the soil again.

MANGE IN DOGS.

Mange as commonly found in dogs is of two varieties, each due to the rapid growth in or on the skin of mange mites or acari. One variety which causes intense itching is known as sarcoptic mange. The symptoms are small red patches, extending, which the dog continuously rubs; they may be on any part of the body, but generally commence on the head and ears and lower line. The skin is red and inflamed, and has small papules and vesicles not unlike those of eczema. The hair falls off and the skin becomes thickened and grey and scurfy. The disease spreads quickly, and in a few weeks the whole body may be involved, the dog becomes poor and miserable. Treatment, says the Veterinary Lecturer (Mr. F. E. Place, B.V.Sc., M.R.C.V.S.) demands the destruction of all bedding and the disinfection of sleeping places, otherwise a cure is impossible. A soda bath should be given, and when dry half the body should be dressed with a mixture of flowers of sulphur 4ozs., liquor potasse 2ozs., oil of tar 2ozs., and olive oil to a pint. In four days to a week he should have another soda bath, and the other half of the body should be dressed. A week later all the grease should be removed by another soda bath, and in most cases the dog will be cured.

The other form of mange is known as follicular, and occurs in two forms, pustular or squamous, *i.e.*, in mattery heads or scurfy scales. It generally begins round the eyes, and spreads to the face and forehead, it then appears on the feet and legs, especially inside the elbows, and gradually extends over the body. The first symptoms are patches of baldness, the skin is hot and purplish, with papules and pustules; as the patches increase in extent the skin thickens and puckers into folds, especially about the head, and there is a peculiar offensive smell, and the skin turns a slaty grey, cracks, and blood oozes, and often there is a dropsical swelling about the head. The dog seldom scratches, but shivers and shakes himself. For treatment a satisfactory dressing is a mixture of formalin 3 drams, glycerine 2ozs., methylated spirit 2ozs., oil of cloves 3 drams, olive oil 3ozs., almond oil 3ozs. This is applied daily, and there is a reddening and swelling of the skin; after a few dressings the pustules dry, become scaly, and disappear; the skin becomes soft and healthy. Sulphur ointment is then applied for a few times, and followed by a daily dressing of formalin ½dram, glycerine 1oz., tincture cantharides 1½ drams, salicylic acid ½ dram, methylated spirit 1 dram, almond oil 2ozs., olive oil 6ozs.

The hair begins to grow and the worst case is cured.

The squamious or scaly type is more generally found in small pets than in farm dogs, and requires less drastic but more persistent treatment.